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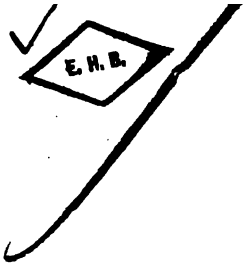
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John D. Stewart, Indianapolis.
A. J. Sheridan, Indianapolis.
Stewart Schrock, LaGrange.
J. C. Armington, Anderson.
Alice L. Hobbs, Indianapolis.

PREFATORY.

The titles of forty-six papers were printed in the program of the Indianapolis meeting. Of these forty-three were read and discussed before the general, medical or surgical sections, and thirty-nine are printed in the present volume of the *Transactions.* Dr. Hessler retained his paper on Urinary Casts, as the basis of further research; the paper of Dr. Bowers, now of Dayton, Ohio, on Abdominal Pregnancy was received since the forms were closed. The papers of Drs. Hutchins and Allen of Indianapolis on Spastic Diplegia were not left with the Secretary. All of these papers may be published in the *Journal of the Indiana State Medical Society,* which hereafter takes the place of the annual bound volume of the *Transactions.* The *Journal* will issue its first number January 15, 1908, from Fort Wayne, and will publish six numbers before the Fifty-eighth Annual Session of the Association at French Lick Springs next June. The papers not published may be forwarded to the editor, Dr. Albert E. Bulson, Jr. The papers of Drs. Allen Hamilton and G. Von Sweringen were not presented at the meeting, and have not been received by the editor.

The several reports on State Medicine and Hygiene, by Dr. Hurty, Chairman; Tuberculosis, by Dr. Potter, Chairman; Prevention of Venereal Disease, by Dr. C. E. Barnett, Chairman; Medical Education, by Dr. L. F. Page, Chairman; Public Policy and Legislation, by Dr. W. N. Wishard, Chairman, etc., were amplified discussions, equivalent, often, to set papers, and might well have been discussed in general session. They are presented in their usual places except that Dr. Potter's report was included in the Symposium on Tuberculosis. The excellent group of four papers on Opsonins, considered theoretically and practically as they were by Drs. Reed and Thurston of Indianapolis, and by Drs. Weaver and Rhamey of Fort Wayne, are an index of the avidity with which the young men of the Society take up and apply the new scientific discoveries and theories which appear from year to year in medicine.

The present volume, as a whole, we believe to be highly creditable

to the Association, and a fitting and dignified complement to the half hundred and more that have preceded it. Of these volumes the present editor has revised nearly a score, and of the scientific articles in them he has printed in the same series of years nearly one-half in the *Indiana Medical Journal*. Therefore his relations with the profession in Indiana have been immediate and continuous and he hopes equally helpful and friendly. He wishes particularly to express his gratitude to the various officers of the Society, who from year to year have given him their affection and good counsel, and particularly to the Secretary and Treasurer for the last twelve years, Drs. F. C. Heath of Indianapolis and A. E. Bulson of Fort Wayne.

The friendships enlarged and cemented in these editorial relationships with the members of the Indiana Society remind the writer of the final words of Pericles to Aspasia as narrated by Landor. For while within the century of Pericles had existed the greatest part of those who since the origin of the world have been the luminaries of the human race, his strongest affections were with the physicians who were battling with him against the plague in Athens.

"To have lived with such men," he is made to say, "to have enjoyed their familiarity and esteem, overpays all labors and anxieties. I were unworthy of the friendships I have commemorated, were I forgetful of the latest that have come into my life. Sacred they ought to be, for they were formed under the porticoes of death, and included the most sagacious, the most scientific, and the most beneficent of philosophers and physicians, among them Ancon and Hippocrates. If mortals could war against Pestilence and Destiny they had been victorious. I leave them in the field; unfortunate he who finds them among the fallen."

A. W. BRAYTON.

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PRESIDENT'S ADDRESS BEFORE THE FIFTY-EIGHTH SESSION OF THE STATE MEDICAL ASSOCIATION AT INDIANAPOLIS.

GEORGE. J. COOK, M. D., INDIANAPOLIS.

Members of the Indiana State Medical Association:

The program for the present session indicates that the committee on arrangements has changed the custom which has prevailed during former years. The oration by some invited guest has been omitted; the time devoted to social functions has been limited, and the president's address is given at the beginning of the session. The intention of this is to give as much as possible of the time of the society to the reading of papers and their discussion. The committee was prompted to do this because criticisms came from numerous members to the effect that in recent years the scientific part of the program was in a sense made secondary to the social functions, orations, etc.; that there was not time left for proper presentation of papers and discussion, and that many papers were read only by title. Members do not care to give the time and work necessary to prepare a paper for our society and take the risk of having it passed perhaps without debate or read only by title, for want of time. I regard this question as a serious one. To the same end my remarks this morning will be brief.

The success of our state society depends on the activity of the component societies. As the units are perfected, the composite body will be strengthened. In order to advance the interest in the central body we must encourage work in the component societies. We can do this by assuring members of the county societies, who present papers, that they will have ample time for such presentation and full discussion. It is to achieve this end that the present program has been arranged. We have on the program forty-seven papers and scientific reports on varied and interesting subjects, and I trust that every paper will be read and fully discussed. The by-laws provide that the read-

ing of each paper shall not occupy more than twenty minutes and the time for its discussion by each member shall be limited to five minutes. It will be necessary to observe these rules strictly in order to complete the program.

Our society will be fifty-eight years old on June 6th next. Its growth during these fifty-eight years has been continuous, and at times remarkable The printed proceedings of each year show that its members have kept abreast of the times in medicine. In fact, one needs only a file of these transactions of our society to trace the advance in medicine during the past half century.

On June 6, 1849, twenty-eight physicians of the state met in this city and organized this society. We now number nearly 2,500. The adoption of a new constitution in 1866 marked a new era in our society. It changed the society from a primary voluntary society to a representative one, making the county societies the units in the formation of the state society. This constitution was a remarkable production at that time. Under it our society increased so rapidly that it soon occupied the rank of third in membership among the state societies of the United States.

Thirty-seven years later, when the American Medical Association was reorganized, our constitution was taken as a model for state organization. This constitution was written amidst inspiring surroundings. It was written on the tented field of the Army of the Cumberland, in the spring of 1864—a time when thorough organization and discipline determined success, when the perfection of the unit represented by the regiment determined the efficiency of the whole body. With those inspiring surroundings, Dr. William Lomax of Marion, Ind., surgeon of the 12th Indiana regiment, on the request of other Indiana surgeons in that army corps, prepared this constitution. It was sent to the society at the meeting of 1864, but was not adopted until 1866. These are facts familiar to the older members present, but I think they are of sufficient importance to be repeated now, and that due credit be given to Dr. Lomax for this work in medical organization, a work far in advance of that time.

I shall now call attention to some matters pertaining to medical legislation.

The importance of organized effort in the line of medical legis-

lation has been recognized since the organization of our society. At its first meeting, in 1849, we find the following resolution, which was unanimously adopted:

"Be it adopted, That a committee of five be appointed to memorialize the state legislature on the subject of homicidal insanity, asking the enactment of a law requiring that in all cases in which the plea of insanity is set up as an excuse for crime, the question of insanity shall be first and separately tried and decided by a commission of lunacy."

This is interesting in the present period of "brain storm" pleas as defense for premeditated homicide.

The constitution of the American Medical Association established a committee on medical legislation, this committee consisting of three members. This committee has the power to cooperate with the officers of the state societies in creating a national legislative council, which council shall be called in conference by the committee once each year or oftener, to consider questions of national and state legislation with the view of uniting all the influences of the profession of the country in support of proper legislation, and securing uniformity as far as may be possible and expedient. The committee has organized this council, and urges state societies to appoint a committee as its representative at the meeting of this council.

This council was called together in Washington, D. C., December 13-14-15, 1906, by Dr. C. A. L. Reed, of Cincinnati, chairman. This council, established by the American Medical Association, is certainly an important body, and I would suggest that the house of delegates establish a permanent committee to represent our state society at all future meetings of this council. I can find no record in our transactions of such a committee having been appointed in the past. The printed record of the meeting of the council in December last is most interesting. The principal questions discussed related to the organization of a national department of public health, with representation in the cabinet of the president; the army medical reorganization bill; anti-tuberculosis legislation; uniform state laws relating to pure food and drugs; uniform laws with reference to quackery and charlatans, and public meetings for the discussion of medico-political subjects

In November of last year, in the city of New York, a conven

tion, attended by representatives not only of the three learned professions, but journalists, educators, and delegates from more than one hundred educational, benevolent, philanthropic and humanitarian organizations met in convention and effected a national organization for the purpose of waging war upon quackery and charlatanism. This organization is known as the National Public Health Defense League, and contemplates effective organization for this specific purpose in every state in the Union.

Among the things which this league contemplates is to combat indecent and immoral advertising in newspapers; the sale of alcohol, opium and other injurious substances under the guise of "patent medicines"; the practice of medicine by ignorant quacks and criminal charlatans; the adulteration of foods and drugs by dishonest manufacturers; and the mailing to our young men and women, at college, of obscene printed matter under the guise of medical literature, making a base appeal to baser passions; to obtain and disseminate accurate information concerning practices and conditions of every kind that are dangerous to the public health and morals and to work for the enlightenment of the public on all matters affecting these subjects; to assist the constituted authorities in the enforcement of all laws affecting the public health, including those laws for the prevention of quackery, charlatanism and criminal practices in the healing art.

Strange to say, the American people are peculiarly gullible in regard to such matters. We see clergymen, statesmen, jurists, railroad magnates, authors and others of prominence, who should know better, who are constantly appearing as endorsers of this villainous practice. The necessity of uniform laws relating to this question is great, so that when driven out of one state these vampires can not migrate to another, and continue their nefarious practices. Referring again to the first meeting of our society, we find the following resolution bearing on this question:

"Whereas, The members of the medical profession in general have been accustomed heretofore to bestow services upon clergymen and their families gratuitously and have considered it a pleasure to do so; therefore be it resolved, That hereafter they shall demand remuneration from all clergymen as from other patients, who in any manner are known to lend their influence to irregular practitioners or to the dissemination of nostrums."

I would suggest to the house of delegates to consider the propriety of this society inaugurating a branch society of this league in our state.

On May 6, 7 and 8 the National Association for the Study and Prevention of Tuberculosis met in Washington, D. C., at which meeting our state was represented by Dr. Theodore Potter and other members of this society who are members of that association. It is not necessary for me to speak here of the importance of this association and others similar, both state and national, and the inestimable good that can be done, and is being done, by them in the line of disseminating knowledge regarding tuberculosis among the people and enlisting their active aid in the fight now being waged against the great "white plague." This evening will be given entirely to the consideration of the question of tuberculosis, and the public is invited to be present, following the plan adopted by other medical societies to encourage the people to study this question.

It requires time and patience to educate the people along medical lines. Money and fame first, good health and long life last, seems to be the order of thought. It required ten years to have a pure food and drug law enacted in our state. Our last legislature did some good work in medical legislation. It passed the pure food and drug law, the law providing free antitoxin for the poor, a new law on vital statistics, a law requiring cases of tuberculosis to be registered, a law forbidding the distribution of free samples of pills, tablets and other medicines, and a state hospital for cases of incipient tuberculosis is now assured. All this is greatly to the credit of our last legislature. The pure food and drug law confers upon the State Board of Health the power and duty of enforcement. It provides it with a chemical laboratory, a chemist who is also a state food and drug commissioner, and has power to employ all necessary assistants. It also provides in a summary way for the control of unsanitary slaughter houses and the handling of meats. This last is certainly much needed and most important. An appropriation of $15,000 was given to this department.

We are indebted to our fellow-member, Dr. J. Frank Simison, representative from Tippecanoe County in the last legislature, for free antitoxin for the poor. Certainly there could be no more

worthy charity, and Dr. Simison deserves the thanks of our society for this work. This, together with laboratory service of the State Board of Health in making prompt examination of cultures, makes possible the almost complete abolition of death from diphtheria. The new law on vital statistics is an improvement, but it would have been made better, ideal in fact, if it had required immediate reports of births, instead of giving twenty days for these reports to be made. This defect, we hope, will be corrected in two years.

The appropriation of $30,000 for the purchase of land on which to establish a tuberculosis sanitarium is most important. We can not doubt but that the next legislature will provide for buildings and maintenance. This is a great advance in what might be called humanitarian economy, and the medical profession and especially the Indiana State Medical Association, took the initiative in this matter.

Accurate statistics have been collected, tabulated and analyzed as to disease and death by the State Board of Health since 1899. The statistical law went into effect January, 1900. They now have the figures for several years, which period is sufficiently long to furnish comparisons of some value.

From the board's statistical tables it appears: That the annual death rate has decreased one in the thousand, or 0.7 per cent; that in diphtheria there has been a decrease in mortality in seven years of 39 per cent; in scarlet fever of 39 per cent; in typhoid fever of 29 per cent. It seems fair to say that the medical profession has had the most to do with bringing about this important improvement. The State Board of Health and also most local boards have worked hard to instruct the people how to escape infection. Thousands of prevention circulars have been distributed, and few practitioners nowadays fail to instruct their families concerning the laws of hygiene. These deductions are based upon death rates and indicate the saving annually of at least 3,000 lives. Of course there is a corresponding decrease in cases of disease. Taken together, the saving in lives and in sickness is a benefit to society which can not be expressed in money, being far beyond any possible money estimate.

Indiana now has an efficient State Board of Health and an ideal secretary and executive officer in the person of Dr. John N. Hurty.

It is the duty of every member of this association to assist in every way possible the State Board of Health in enforcing our health laws. By so doing we are performing a duty we owe to our patrons, thus protecting them from disease and prolonging their lives.

I have attempted only to present a few facts in regard to medical legislation, which I thought might interest the society, and some suggestions which I considered of some importance. You are familiar with the history of the past in medicine. The advance in medicine and surgery during the past year will be presented by the essayists whose names appear on the program.

Again I wish to express my thanks to the members of this association for the distinguished honor conferred on me when you saw proper to select me as your president at the Winona meeting one year ago.

THE VALUE OF THE BISMUTH SKIAGRAPH SHADOW IN THE CLINICAL STUDY OF GASTROPTOSIS AND ENTEROPTOSIS.

BY

ALOIS B. GRAHAM, A. M., M. D., INDIANAPOLIS.

ALBERT M. COLE, A. M., M. D., INDIANAPOLIS.

A relaxation of the abdominal walls, of the mesentery, and of the parietal peritoneum, and the consequent lessening of tension pressure, is the initial point or essential feature in the etiology of abnormally mobile abdominal organs. Certain external influences, such as the mechanical action of corsets, tight waistbands, and heavy skirts hung from the waist line, exerting a downward traction upon the abdominal walls, in the female, and the wearing of a belt to fasten the trousers instead of suspenders from the shoulders, in the male, exert a deleterious influence and play an important role in aiding the displacement of some of the abdominal organs.

Slight degrees of displacement of the liver is not an infrequent condition. Kehr maintains that a somewhat movable liver is to be detected in all women who have borne children. However, a complete descent of the liver from its physiological position is a rare condition. Landau has collected thirty-one cases of floating liver, twenty-seven of which were found in women and four in men. He states that most authors underestimate the frequency of wandering liver because this organ is rarely examined while the patient is in the erect posture.

A displacement of a spleen, normal in size, is a very rare occurrence. Glenard discovered it only twice in 160 cases of enteroptosis.

Displaced or movable kidney has received much study and has been given much prominence by both the physician and surgeon. Even the laity is familiar with this particular displacement.

Displacement of the kidney, of the stomach, and of the intestines are associated conditions, it being a comparatively rare condition to find a displacement of the kidney without finding the stomach and transverse colon displaced downward at the same time.

While it is true that early in the 19th century certain clinicians devoted much time and study to displacements of the abdominal viscera, the ordinary clinical methods at that time were insufficient for diagnosing displacements of the stomach and intestines. In 1885, Glenard described these displacements and suggested their clinical significance. Since that time not a small number of the profession have become interested in this condition, and by their labors we are rapidly approaching that point wherein it can be stated our diagnostic methods are becoming so perfected as to enable us to make a positive diagnosis of displaced stomach and intestines. By a positive diagnosis, I mean the ability to outline the stomach and intestines and ascertain their size, shape and position.

Displacements of the abdominal viscera have been described under various headings, such as gastroptosis, enteroptosis, splanchnoptosis, abdominal atony, and atonia gastrica. For practical purposes let us assume that gastroptosis means ptosis of the stomach, and that the term enteroptosis means ptosis of the abdominal viscera.

As far as Voland has been able to observe, the vast majority of so-called neurasthenics were suffering from gastric disorders due to gastroptosis. He feels sure that the most effective point of attack against neurasthenia is unquestionably the previously affected stomach and intestines.

Glenard, in one of his first publications, says: Clinical observation goes to prove that enteroptosis in the same and identical patient is diagnosticated and treated without favorable results, according to the various phases of the trouble, as anaemia, then as a metritis (by cauterization), or as a prolapse of the uterus (where pessaries come into use), then as dyspepsia, then as rheumatism, still further on as gall-stone colic, then as masked carcinoma, still later as a neurosis, as hypochondria, as hysteria, and finally as neurasthenia.

As symptoms of enteroptosis, Krellreuther enumerates the fol-

lowing: General chronic debility, downward pressure, exhaustion, dizziness, heavy-head, fainting spells, lumbar pain, disturbance in the whole abdomen, pain in one or both hypochondriac regions, dyspnœa and head-flushes. In the alimentary canal itself, anorexia, a feeling of gastric insufficiency, easily appeased appetite, feeling of fullness, heaviness and pressure on the stomach (more particularly after eating), tendency to vomit, morning sickness, frequently vomiting after meals, combined with eructations, heartburn, gases and splashing sounds in the stomach, pressure in sunken epigastrium, finally obstipation frequently dominating the whole picture of the disease. Thus far but few writers have paid attention to the co-existence of enteroptosis in cases of mucous colic.

The more vigilantly we search for changes in the position of the abdominal viscera, the more frequently we will diagnosticate them to a greater or less degree. Often the appearance of hysteria, or neurasthenia, leads us to suspect gastroptosis. It may be doubtful which affection existed first. Symptoms of gastroptosis may be entirely absent. These symptoms only make their appearance when the motor activity of the stomach becomes impaired.

As to the frequency of gastroptosis, the reports vary. Meinert, in Dresden, states that the majority of women have displacement of the stomach, and that only about 5 per cent. of men show an alteration in the position of this organ. Similar proportions have been reported by Dennig. Among 2,000 persons who presented themselves at a Stuttgart polyclinic on account of various ailments not connected with disease of the stomach, in 29.7 per cent. of the men and in 75.4 per cent. of the women a displacement of the stomach was determined.

The clinical picture of both gastroptosis and enteroptosis is peculiarly characteristic and practical. With the present day methods at our command, the diagnosis of displacements of the abdominal viscera is easy. However, there is but one method upon which we can rely with any degree of certainty. I refer to the X-ray or bismuth skiagraph shadow method. It is, therefore, to the diagnosis of gastroptosis and enteroptosis that I desire to call your attention, the following remarks being based upon the study of thirty-nine cases, all of which presented gastric or gastro-intestinal symptoms.

In the study of twenty-one of these cases every possible diagnostic method, excepting the X-ray, was employed. In the remaining eighteen cases every diagnostic method, including the X-ray method, was employed.

In outlining a stomach or a certain portion of the intestinal canal it is absolutely essential that we ascertain, if possible, its size, shape and position. To do this the following methods are employed: Inspection, percussion, auscultatory percussion, inflation with carbonic gas or air, illumination with the gastro-diaphane, and the use of skiagraphs.

Inspection, percussion and auscultatory percussion are very deceptive methods. While it is true that in many cases it will be possible to diagnosticate a displaced stomach by the employment of these methods, yet it is impossible to state with any degree of accuracy the position, shape and size of the displaced organ.

The gastro-diaphane, when it works, is almost ideal, but unfortunately in many cases it is impossible to see the light, or, if it is seen, to get it to move in the desired direction.

The inflation with gas or air, if properly used, will enable one to determine a displaced stomach. However, the same objection applies to this method as to the other methods previously mentioned, namely, it gives us no accurate idea as to the size, shape and position of the displaced organ.

There can be no question but that the X-ray or bismuth skiagraph shadow method is far superior to all other methods which have been mentioned. To use the words of Sailer—it is precise, it is speedy, and it gives a variety of information that can not be obtained by any other method. In all of my cases in which Dr. A. M. Cole employed this method, the outline of both curvatures and the position of the pylorus were sharply and clearly defined. The same was true in gaining information regarding the position of the intestines, especially of the colon. In fact, this method enables us to study accurately the stomach and intestines, more so than has heretofore been possible. It can be stated positively that the bismuth skiagraph shadow will reveal marked displacements which repeated physical examination failed to indicate.

Rieder says that all other methods of outlining the stomach are replaced by the radiograph. He disapproves of inflating with carbonic gas on account of the danger to the patient. Schule

considers the X-ray method of the greatest value. Many other well-known authorities could be quoted, all favoring the bismuth skiagraph shadow method in diagnosticating gastroptosis and enteroptosis. The only difference in the method as employed by the various physicians is as to the kind and quantity of bismuth employed, and the vehicle in which it is suspended.

In the writer's thirty-nine cases, twenty-nine occurred in females and ten in males. All presented gastric or gastro-intestinal symptoms. All but four were given test meals, and a complete examination of the stomach contents made. Marked diminution in the secretion of hydrochloric acid was found in twenty-six cases; in five cases it was normal, and in four cases hyperchlorhydria was detected. The liver was in its normal position in all excepting two cases. Spleen normal in all the cases. Unattached right tenth rib found in 30 per cent. of cases. Floating right kidney detected in 90 per cent of cases. The majority of the cases were so-called neurasthenics. Many and varied symptoms were presented.

In every one of the thirty-nine cases a diagnosis of gastroptosis was made by means of the inflation method. That is, a displacement of the stomach was detected. As stated previously, this method will not enable us to determine the exact position, shape and size of the displaced organ. The bismuth skiagraph shadow method was employed in eighteen cases, and a glance at the plates, which will be shown by Dr. Cole, will be sufficient, I believe, to convince the most skeptical individual that this method is far superior to that of any other we may employ. The details of the various steps in the radiographic technique will be explained by Dr. Cole.

In conclusion, for diagnostic purposes, the bismuth skiagraph method excels all other methods. Skiagraph records are permanent as well as accurate. They are of value to the surgeon in his operations upon the stomach and intestines. In addition, the technique is found to be simple, and the inconvenience on the part of the patient is no more than that caused by the introduction of a stomach tube. It enables the physician and surgeon to study carefully their cases before, during and after treatment. And last, but by no means an unimportant factor, there is no element of danger in the employment of the method.

The making of the bismuth skiagram was discussed by Dr. Albert M. Cole, of Indianapolis, following Dr. Graham's paper. A series of twelve plates was shown by electric light. One showed the normal stomach position, and others different degrees of displacement of the stomach, the colon and kidney. Dr. Cole read the following note as to the technique of the process:

The value of the X-ray is now very generally recognized in many medical and surgical diseases and accidents, such as foreign bodies, fractures, dislocations, bone diseases, renal diseases and certain diseases of the chest; but the use of the skiagram in gastro-intestinal disease is of very recent origin, and is unknown to the mass of the profession generally. Among X-ray operators in this country only two—Hulst, of Grand Rapids, and Pancost, of Philadelphia—have done considerable work.

It is the most difficult of all radiographic work. The technique I employ is as follows: The stomach should be empty, and only a light meal an hour or so before the exposure; all clothing removed below the hips. In the case of women a sheet is thrown around the body to prevent any exposure of the person. A piece of metal or coin held by adhesive strips placed on the umbilicus serves as a landmark on the skiagram. In order to obtain the shadow outline of the stomach, some substance must be introduced that is more or less impervious to the ray. For this purpose use salt of bismuth. The subnitrate has been used, but several cases of poisoning have been reported by Pancost. The subcarbonate was used in all my cases, and no untoward effects have been noted. Two or three ounces of the salt in eight to sixteen ounces of thin mucilage of acacia is given to the patient immediately before the exposure. An upright, adjustable plate-holder large enough for a 14x17 plate is arranged against the wall, and this is constructed so that the plate can be raised or lowered as the size of the patient may require. Before this the patient stands, the abdomen against the plate, the hands supported by the top of the plate-holder, which aids in holding the body quiet during the exposure. The tube is placed behind the patient, twenty-two inches from the plate, the anode on a level with the umbilicus. The patient fills the lungs and holds the breath during the exposure, for only in this way are we able to prevent movement of the stomach and blurring of the plate. Short ex-

posures consequently must be given, and never to exceed fifteen to twenty seconds. For this purpose only the most powerful coils and heavy target tubes are suitable, and as large a current should be forced through the primary of the coil as the tube will stand. If a skiagram of the small intestines is desired, a second exposure is made about six hours after the ingestion of the bismuth, and for a skiagram of the large bowel twelve to eighteen hours are allowed to elapse. The bismuth solution may also be injected into the rectum; by antiperistalsis it will be carried up from the sigmoid and colon, and the exposure can be made in from one-half to one hour.

The use of the bismuth method in the diagnosis of gastro-intestinal disorders is entirely practical, and marks a distinct advance in scientific medicine. For organic changes in the tissues, such as chronic inflammation, ulcer and cancer, we can not at present claim that the skiagram is a positive test; but in the future, as our technique improves, we may be able to show gross pathological changes. The only objection to the method is the difficulty and cost of producing the skiagrams. The advantages, however, far outweigh the objections, for it has brought exactness and certainty into a somewhat obscure field of diagnosis.

DISCUSSION.

Dr. Geo. D. Kahlo, of French Lick Springs: I congratulate the gentlemen on their good work. It has been valuable in the diagnosis of cases they have had under observation, and it is of especial value in drawing attention to the frequency with which we find displacements of the stomach and intestines associated with gastro-intestinal derangements—the vague dyspeptic symptoms which are so common in nervous cases, as has been demonstrated very frequently, the result of abnormal conditions of the abdominal viscera. And thus arises the question of the frequency with which gastroptosis and enteroptosis are associated with displacements of the kidney. How often do we see cases of nephroptosis operated in which relief is not found simply because associated with the floating kidney there has existed a gastroptosis or an enteroptosis. How frequently do we see displacements of the uterus treated by fixation fail to afford relief simply because it

does not relieve the entire condition. In 90 per cent. of these cases we can detect a floating kidney. I believe this represents a fair average of the cases. The symptoms of colitis are very frequently erroneously interpreted. We call them neurasthenic, dyspeptic, hypochondriac and various other designations, when investigation and careful examination will show displacement of the colon.

One question that occurs to me is the possibility of error in this method, as in the weight of bismuth used, together with the volume of fluid in which it is suspended, and having the patient take a deep inspiration, forcing the diaphragm down, the plate might exaggerate the condition present. However, it is of special importance in the beginning in drawing attention to the frequency with which we find such displacements of the abdominal organs associated with nervous symptoms.

Another importat point, it seems to me, is that these skiagraphs show the vertical position of the pylorus, which we ordinarily assume to be downward. Personally, I believe it is quite possible to outline the position of the stomach and also of the large intestine by careful physical exploration, particularly auscultatory percussion. I believe that is a very exact method by those who have given it exact study. It is not a difficult procedure and merely needs practice.

Dr. C. S. Bond, of Richmond: I also want to compliment the authors of the paper, especially the skiagraphs, which were extraordinarily good, I think, and I know the painstaking efforts this matter has cost these men, because I have had experience myself. It seems to me I would like to see the skiagraphs of patients in deep breathing and the same patients represented with the breath entirely out. I am inclined to think the skiagram taken in deep breathing would be probably three or four inches lower in some cases, depending of course upon the individual. Again, I am inclined to think a person who has had a good deal of experience with the stethoscope and with percussion in cases with very little gas in the abdomen will be nearly always able to outline the stomach. Still, as said by Dr. Kahlo, it requires some experience to do that satisfactorily. There is a peculiar sense that comes to your finger as well as to your ear in stomachs

with gas. The less gas in the stomach the better, because the position will be more nearly normal.

I had a peculiar case a short time ago in which I was able to make out the position of the stomach before the patient died, and then I made a post mortem. The trouble in this patient had been going on for fifteen or twenty years, and he died from hemorrhage from an ulcer in the larger curvature of the stomach. On post mortem it looked like a congenital condition. It is so common in these stomachs low down that I rather suspect now it might be due to dilatation of the stomach and softening of the stomach wall.

My experience in photographing small animals after death with accumulation of gas shows that you can outline the whole alimentary canal. I have wondered whether this procedure could not be carried into the actual work of diagnosis. I hardly suspect that the dark lines in Dr. Cole's skiagrams are due to gas. But I may be mistaken about that.

Dr. Edwin Walker, of Evansville: I think these studies should be encouraged by the society, and yet in this particular presentation the unessential points have been brought into prominence, and dwarf the more essential points. I think Dr. Graham's paper will give the impression to most of us that functional nervous diseases and many other functional troubles are due to enteroptosis. That, I think, is an error. Snelling pointed out some years ago that those individuals who have a narrow costal angle are prone to displacements of the viscera, and the stomachs of these individuals are normally below the point of persons with a broad costal angle, and unless we find there is some organic interference with these organs it is not of great importance. And it is true that many persons have slight displacements of the kidney that are of no clinical significance. It seems to me the stomach specialists have a tendency to bring forth so many methods of examination that they give the general practitioner the impression that this is really a very difficult subject, when it is very simple. We can determine all we want to know about the lesser curvature of the stomach, except in rare instances, where it is important to determine those things, and this work is invaluable in that respect, though in your work every day as practitioners you can find out near enough where the greater curvature is if you

want to, and in a great many cases it is not worth while. In narrow-chested individuals it is below the umbillicus. Those cases of enteroptosis that demand special attention must be extremely rare. The simplest method of determining the greater curvature of the stomach is to examine the patient with an empty stomach and then allow him to drink a half a glass of water, and by percussion you can nearly always accurately fix it. I think very few diseases attributed to enteroptosis are due to enteroptosis at all. They are due to the fact that in the first place all that class of individuals have a tendency to neurasthenia—have a tendency to depression. All functional diseases cover this class of cases.

Lady Member: I want to appeal to my own sex on the question of woman's dress. What is the use of talking about these skiagrams that show ptoses of the organs if we are not going to do something for their prevention. Prophylaxis is said to be the most important part of treatment, but what chance is there under the mode of dress we are using today?

Dr. B. H. Perce, of Anderson: For a great many years I have been examining a great number of old soldiers with ptosis of the stomach and bowels, and I am free to say that very few of them have neurasthenia. Usually it comes from conditions of chronic diarrhoea and chronic constipation or obstipation. I fully recognize the valuable work of the essayists. It is very interesting, and in some cases, as has been said by one of the speakers, I am satisfied we can get great benefit from that character of diagnosis or examination. But usually it is not a difficult matter to make a thorough and satisfactory diagnosis of these cases of disease of the bowels and stomach.

Dr. F. R. Charlton, of Indianapolis: I can not reconcile Dr. Walker's statement that nearly all cases if enteroptosis have neurasthenia, as he does not give reasons for it.

Dr. Walker: I said it occurs in that class of individuals.

Dr. Charlton: It is pretty hard to tell what causes prolapse of the viscera.

Dr. Walker: I had a case recently that had enteroptosis, and she had no neurasthenia and had perfect digestion.

Dr. F. B. Wynn, of Indianapolis: Dr. Walker has raised a very interesting question as to how often the various conditions in the abdominal cavity are responsible for neurasthenia. A few years ago gynecologists attributed most cases of neurasthenia to pelvic conditions. I have at this moment in mind a case operated upon by one of our most distinguished gynecologists six or seven years ago. He first removed one ovary and then the other in a brilliant young woman who had pronounced neurasthenia. Now that didn't relieve her. On the contrary, she went four years afterwards bedridden, profoundly neurasthenic. This is simply an isolated case. Under treatment directed purely to a neurasthenic condition, a nervous state rather than any pelvic condition, she got better in three or four months. It has occurred to me time and again that abdominal surgeons are prone to attach undue importance to lesions of the abdominal viscera in causing nervous symptoms. Now come those who blame prolapses of the stomach and intestines as the chief cause of neurasthenia. I think we should go slow. Do not forget the neurotic element in patients. I think the illustration cited by Dr. Walker is pertinent. Why in umbilical hernia do we not have neurasthenia, or in scrotal hernia? Still the individual gets along and the functions are performed fairly well. I am willing to admit the magnificent work of the gentlemen in positive diagnosis. No other method can approximate the bismuth skiagram, but in attaching undue importance to these things as causing neurasthenia I think we are apt to err.

Dr. A. C. Kimberlin, of Indianapolis: We know the effect of visceral displacements, and how frequently we encounter unquestionable cases where the space between the surgeon and the general practitioner is not very well filled in. The surgeon may correct a displacement or remove a deformity, but the patient is not relieved, because it is always, as Dr. Wynn says, necessary to eradicate the impression that has been made upon the nervous system. We have a class of cases suffering from ptoses, and they end in the surgeon's hands. We have to keep in mind that these patients are liable to perversion of the functions because of improper nourishment. Various intoxications are more likely to occur and manifest themselves in the splanchnic circulation. We see neurasthenia in school teachers, in men with sclerotic arteries.

We see it in those engaged in the most strenuous occupations, and in those who live lives of absolute luxury and who never did hard work, where it is acquired from idleness and inactivity rather than from ptosis of the abdominal viscera, many of which are displaced, to be sure. It gives us an exaggerated picture of what we expect to encounter. As Dr. Walker says, we are not able to depend on these methods, and if we had to depend on them many patients would go untreated, while we are able to map them out for most practical purposes by other methods.

Dr. Theo. Potter, of Indianapolis: Now, it may be true that in a large portion of cases it is not necessary, in order that the stomach may be located, to go through this process, yet there are cases in which it is very difficult to locate the organs without some such aid as this, and if, therefore, there is a method added to our previous resources by which it may be done it constitutes a distinct addition to our knowledge of medicine. The discovery of the tubercle bacilli is a distinct addition to our knowledge of tuberculosis. Catheterization of the kidneys, while it may not be used in many cases, is a distinct addition to our methods of diagnosis. And so all along the line. If there is any point in our work where there is a defect and something is given to us that helps to cure that defect in even the fewest number of cases, that constitutes a distinct step in the progress of things. So that while we may admit that this method is not necessary in all cases, yet it fills a gap hitherto unfilled, and should be recognized as a valuable piece of work and a useful addition to the science of medicine.

Dr. A. B. Graham: I regret that our papers have brought forth such a lengthy discussion on neurasthenia. It was our purpose to present to this society a comparatively new and at the same time a most accurate method for diagnosing displaced abdominal viscera. As to the subject neurasthenia, I merely used the following words of Volland: "As far as I have been able to observe, the vast majority of so-called neurasthenics were suffering from gastric disorders due to gastroptosis." He (Volland) feels sure that the most effective point of attack against neurasthenia is unquestionably the previously affected stomach and intestines.

I desire to go on record as stating that I believe this method of diagnosing displaced abdominal viscera will eventually replace our older methods in many cases, and that it will revolutionize the medical and surgical treatment of abdominal diseases to a great extent.

This morning you have listened to the discussions upon this subject. Physicians—men whom all of us admire and whose opinions we respect—have told you that it is an easy matter to outline the stomach. In reply to this statement I can only tell you that Dr. Cole and I have been fortunate enough to secure skiagrams of stomachs and colons which had been previously outlined by some of our most capable and competent physicians in Indianapolis. A skiagram in itself is a convincing argument. The skiagrams which Dr. Cole made demonstrated clearly one of two things: either the physician failed to make a careful examination of the abdomen, or if he did, his methods of examination failed to locate the position of either the colon or stomach.

I do not wish to have you believe that I have discarded all methods of physical examination for the X-ray method of examination. As stated in my paper, in twenty-one cases every possible diagnostic method excepting the X-ray was employed. In the remaining eighteen cases every diagnostic method, including the X-ray, was employed. In every case I should most emphatically urge the employment of all the diagnostic methods at our command.

Dr. Walker is right when he says that we can locate the stomach in many cases by having the patient drink a glass or two of water; and yet this will not give us the same true picture of the organ as can be determined by the X-ray method.

Dr. Kahlo is right when he says that by a careful physical examination we can outline the stomach. I take it for granted that by a careful physical examination the doctor means the employment of all the methods of examination at our command, and this must necessarily include the X-ray method. The auscultatory-percussion method has been practiced by me in all my cases. I find it easy of employment but not nearly so satisfactory as the X-ray method.

I would suggest that you keep in mind these statistics: "Among 2,000 patients who presented themselves at a Stuttgart

polyclinic on account of various ailments not connected with disease of the stomach, in 29 per cent. of the men and in 75 per cent. of the women a displacement of the stomach was determined. In women between the ages of forty-one and forty-five gastroptosis was present in 96 per cent. of the cases." Such, gentlemen, are the statistics that confront us, and which demand our attention in the consideration of this subject.

Further, I would suggest that you keep in mind the motor activity and not the secretory activity of gastroptosed stomachs, for it is an established fact that there are no marked or prominent symptoms present until the motor power of the stomach becomes impaired. In other words, we as a rule fail to make complete examinations in those cases where the gastroptosed stomach continues to maintain good motor activity and as a result we fail to diagnose the gastroptosis.

Always examine for the unattached tenth rib; then for a floating right kidney, and if you detect these conditions you can put it down as an assured fact that you will find an enteroptosis associated with it.

What is the treatment of gastroptosis, or better, of enteroptosis? Surgery so far has failed to give ideal results. The most successful results have been attained by the application of the Rose bandage or some modification of it. The patient is placed in an exaggerated Trendelenberg position so as to favor a return of the abdominal viscera to their normal positions. Then by a proper application of zinc oxide adhesive plaster on moleskin these organs are easily maintained in their proper positions. Gentlemen, while we have had some failures with this treatment, it is no exaggeration when I tell you that the majority of my patients have been benefited, and some have requested me not to remove the bandage, so marked has been their improvement. Rose claims to effect a cure in his cases. I do not wish to go on record as saying how long it will be necessary to keep this bandage on, but we apply a new one about every six weeks. Further, I do not want to go on record as saying in what manner this bandage effects a cure. In all probability it is an improvement of the motor activity of the stomach.

In reply to those physicians who claim it is an easy matter to outline a displaced stomach or colon, I am willing to bear the ex-

pense, and I believe Dr. Cole will assist me, in making skiagrams of their cases. This in itself will be sufficient to demonstrate the errors made by the ordinary methods of physical examination.

Dr. Kahlo refers to the weight of the bismuth and the possibility of its causing the stomach to assume a lower position than normal. Keep in mind the anatomical position of an empty or fasting stomach and of a stomach containing an ordinary meal. The bismuth mixture represents the weight of an average meal. There is no plausible argument as to why it should cause a marked displacement of the stomach.

As to Dr. Bond's question regarding the position of the stomach in deep inspiration, we have been able to demonstrate that very nicely. The difference in position in deep inspiration and deep expiration will be not more than one inch.

We were somewhat skeptical about presenting this paper to the society, because of the fact that until a week ago we had been unable to find a stomach in the normal position. Fortunately, a neurasthenic in every sense of the word furnished us the much desired skiagram. I desire to thank the gentlemen for their most thorough discussions of this most interesting subject.

Dr. A. M. Cole, of Indianapolis: Dr. Graham has answered most of the questions. I will only say that I will very gladly try to show some of the Indiana specialists that it is possible to make mistakes in this line of work. The eastern men are confessing that they are mistaken in a large percentage of cases. Dr. Pancoast told me last summer that he had demonstrated time and again that some of the best physicians in Philadelphia had made mistakes in outlining stomachs.

Our only plea for this paper and for this class of work is in the matter of exactness. I believe this is the only absolutely exact method, and feel it must rest upon that point.

HYPERAEMIA AS A REMEDY.

BY LOUIS BURCKHARDT, M. D., OF INDIANAPOLIS.

The patient was a victim of his patriotism. The celebration of the Fourth of July and the birthday of an heir apparent to the German emperor had almost cost him the loss of his right leg. A cannon had exploded and some fragments had fractured the shaft of the tibia and fibula to such an extent that the young man was immediately sent to Bonn to Prof. Bier's clinic for amputation of the leg. Although the case was considered a hopeless one, as well on account of the extensive destruction of bones and soft parts as on account of the evident symptoms of septic poisoning of the wound, an effort was made to save the limb. The wound was superficially cleansed, pieces of clothing and loose splinters, easily accessible and visible to the naked eye, were removed, the wound covered with a loose piece of aseptic gauze and an elastic bandage applied above the knee.

We saw the case on the sixth day after the accident. Temperature, 99 degrees; pulse, 76, and general appearance good; the wound was suppurating freely, showed healthy granulations and did not cause any pain. The most interesting feature, however, was the course of the temperature. When admitted to the hospital the patient had a temperature of 104 degrees. Ten hours after application of the elastic bandage the temperature dropped to the normal and remained there until the bandage was removed twenty-four hours after it was put on. Immediately the temperature shot up to 104, where it remained until the elastic bandage was reapplied, when again it dropped to the normal. The same result was attained each time a change of the elastic bandage took place, only that the rise of temperature was less marked each subsequent day. On the morning of our visit the thermometer had marked 100 degrees; the prognosis for life and limb had changed from the worst to the best.

For a number of years I had used dry cupping rather extensively for the relief of pain in neuralgia and lumbago; also in the

sacro-iliac pains connected with pelvic diseases, and especially the pains due to pulmonary tuberculosis. A scheme devised by Dr. W. N. Wishard has simplified the application of large cups considerably. It consists in anointing the parts with vaseline, which permits the sliding of the cup over large areas; for instance, the whole length of the spine without reapplying it.

The reports of the remarkable results gained with the systematic use of active and passive hyperaemia caused me to visit the surgical clinic of Bonn, where Prof. Bier had inaugurated and elaborated this new form of treatment—a treatment that is destined to transfer many forms of diseases hitherto considered as strictly belonging to the surgeon to the realm of the general physicain.

All the important phenomena of life are connected with hyperaemia. Any organ during activity is hyperaemic. Growth and regeneration are accompanied by local hyperaemia; the amount of hyperaemia corresponds to the intensity of growth. We never miss hyperaemia wherever the system reacts on foreign substances, be they of macroscopical or microscopical size, or be they chemical poisons. There is no form of disease that the system may conquer that causes anaemia; it is always conquered by hyperaemia. Therefore, if we consider the reactions of the body as useful efforts of nature at healing, we must insist that hyperaemia is the most extensive of means at self-preservation.

Hyperaemia depends as often on a slowing as on an acceleration of the blood stream. The idea that only increased circulation or relief of harmful stasis can improve the nutritoin of the parts is erroneous. If we propose to imitate nature we must in some cases accelerate the circulation; in other cases produce a venous stasis. We know that the fast flowing blood stream retains its liquid and its formed constituents and carries them along, but that the slow running stream sends them out into the tissues, where they exercise their physiological function. The system under the influence of inflammation transforms the fast running circulation into a sluggish one. We may discriminate between active, or arterial, and passive, or venous, hyperaemia.

Active, or arterial, hyperaemia does occur after the removal of an Esmarch constriction bandage, when the blood rushes into the previously depleted arteries. Massage, electricity, chemical and

thermic instants have the same effect. The most practical means is the application of heat, which calls for an increased arterial circulation. Of all the methods of applying heat, hot air is the most useful. Such a hyperaemia produced by heat can serve without any mediation of the central nervous system or the peripheral nerve trunks. The engorgement of the blood vessels does not only affect the superficial but also the deeper vessels, even those in the bones. An increased arterial circulation is absolutely necessary to counteract the effects of high temperature, as it acts as a cooling stream. The construction of plain or electrical hot air apparatus is too well known to call for a description. Heat should never produce painful or unpleasant sensations; it must only be pushed to about 280 degrees Fahr.; one hour, even half an hour, treatments once a day are sufficient. The healing effect of hot applications is directly due to the protective active hyperaemia, but not to elimination through perspiration or the depletion of deeper parts toward the surface.

Passive hyperaemia, or venous stasis, as a remedy has been applied by Ambroise Pare to hasten callus formation; later on by Dumreicher, Thomas and Helferich. The introduction of the elastic bandage applied above the injured part we owe to Bier.

The rubber bandage is applied (above the affected part) in a number of circular turns, just tight enough so the thin-walled veins are obliterated, whereas the strong-walled arteries are not or only slightly compressed. Using the bandage on the upper arm, for example, we notice a swelling of the subcutaneous veins of the hand, then of the large subcutaneous veins of the palm or side of the forearm. Hand and forearm show a bluish discoloration, palm and elbow, however, turning rosy, intermingled with peculiar whitish spots.

After three hours the skin of the forearm is uniformly blue, the fingers, hand and elbow are bright red. The cutaneous and subcutaneous veins have disappeared; we observe beginning edema. The pulse is good and strong; rubbing of the skin brings out arterial hyperaemia.

Twenty hours after the application an increasing edema is noticeable; the circumference of the arm has gained one inch, the skin temperature has increased by two degrees. Beyond twenty hours the bandage ought not be left in situ. A constriction lead-

ing shortly after application to edema or extravasation of blood must be carefully avoided; especially must we be able to feel the pulse distinctly. Immediately after removal of the bandage a lively redness appears, the so-called reactive hyperaemia. This is due to the demand of the tissues for oxygen and not to pressure-paralysis of the vasomotor nerves. This reaction comes more slowly the oftener and longer the venous hyperaemia has been produced on a limb.

The length of time during which the constricting bandage is permitted to stay on the same limb depends on the plan of application and the character of disease. On the long humerus and femur the bandage may be shifted every few hours and the compression continued for twenty hours; on the shoulder or hip joint, where such a shifting is impossible, ten hours is the limit. Affections located on the head are reached by the neck bandage, an elastic ribbon one inch wide, armed with a series of hooks and eyes, which allow a gradual tightening, so that a marked swelling and cyanosis of the face is produced. Arteriosclerosis is a distinct contraindication. One rule must always be kept in mind —a constriction bandage which is to be left for any length of time must never cause pain or paraesthesias. Decubitus and atrophy can be obviated by carefully shifting the place of application; varicosities have never been produced by this treatment. Slight extravasation of blood may occur, as indicated by a yellowish discoloration of the skin; hemolysis, however, could never be produced, even after protracted and excessive hyperaemia had been made for experiment's sake. As we constrict the lymphatics as well as the blood vessels, we produce even more damming back of the lymphatic than of the blood flow.

Next to the elastic bandage, suction apparatus is of great practical value in producing local hyperaemia. The old-fashioned cupping glass, armed with rubber balloons and shaped to be easily adjusted (to the nose as well as) to any part of the body, has given great satisfaction. The most effective and most extensive hyperaemia can be secured with the application of so-called boots of Junod; cups large enough to introduce a whole arm or leg. They are preferably made of strong glass, with heavy rubber cuffs to admit of a close adaption to the limb. As the vacuum increases the limb is pushed into the apparatus with considerable

force, for which action the rubber cuff must make the necessary allowance. This suction action has been utilized with great success for orthopaedic purposes. Stiffened joints may be bent or stretched with more force, but less pain, as the amount of pressure can easily be regulated. These large apparatuses, however, demand a certain discretion in their use, as the local hyperaemia may withdraw too much blood from the rest of the body and cause syncope or shock, or extensive ruptures of capillary vessels may occur. The physician who wants to make use of suction apparatus ought to try them first on his own limbs.

Having discussed the methods of producing hyperaemia, we shall consider now its action. There is hardly an effect of hyperaemia that may compare with the relief of pain obtained by its use. This is likely due to the serous infiltration of the tissues, reducing the irritability of the nerves, as we see it in another instance, namely, Shleich's local anaesthesia. This pain reducing action of hyperaemia preserves joints from becoming ankylosed in faulty positions, as the reflectory contracture would favor it, and permits of an early beginning of passive motions.

If we observe cases of acute infection, like the one reported above, which under the influence of constriction hyperaemia not only promptly show improvement and cure, but where immediately after the use of the remedy a revulsive change takes place, then we can easily see that we are confronted by a destruction or at least a debilitation of the disease producing elements. That constriction hyperaemia has the power to destroy bacteria has been proven experimentally by Noetzel. He produced a high grade hyperaemia on the legs of sixty-seven rabbits, then inoculated the limbs with highly virulent cultures of anthrax and streptococci; fifty-one of the animals survived, sixteen died; in all of the sixteen that died the constriction bandage had been applied too tight, as shown by incipient gangrene. All the inoculated animals perished; so did the animals that had previously escaped, when they were again inoculated with the same bacteria, but without the protecting constriction bandage. The exudation of serum with its leucocytes offers a satisfactory explanation for this phenomenon, whether we accept Metschnikoff's phagocytosis or Wright's opsonin theory.

For the destruction of the bacteria a renewal of the blood and

the serous exudate is imperative. Excessive disturbances of the circulation and chronic edema favor the occurrence of infection. Therefore, in infectious diseases the constrictoin bandage must not be left in situ permanently, but changed at repeated intervals.

The influence of hyperaemia on the absorption of the toxins depends largely on the velocity of the blood flow. A lively circulating blood will promptly absorb and carry off substances held in solution; whereas a sluggish circulation will take up but little of an exudate. Of interest in this case are our experiences with snake venom, where nature protects the system by causing an extensive clotting of the blood in the affected limb in order to prevent absorption and a general systematic poisoning. The tying-off of the wounded extremity by the natives may be regarded as a remedy gained from the observation of nature's efforts at healing.

Under the influence of the active hyperaemia caused by hot air, or the passive hyperaemia due to constriction, we see solid substances, like blood clots, scar tissue and organized fibrous deposits in stiffened joints, dissolved and resorbed. Here, also, we may quote as a corresponding power the fate of the cicatricial constrictions of the vagina, which, under the influence of pregnancy, and especially labor, become softened and disappear completely before the advancing head. As early as 1869 Bilroth wrote: "One of the actions of the living cell consists in its power to metamorphose connective tissue and fibrous tissue into a soft, gelatinous state. It is not the suppurative powers alone that can produce such a dissolution, but also the hyperaemia that precedes and accompanies suppuration."

So far we have demonstrated that arterial and venous hyperaemia reduce pain and dissolve organized deposits, that arterial hyperaemia promotes resorption, that passive hyperaemia has a healing influence on infections. There remains the question to be answered whether a nutritive or regenerative influence must be attributed to hyperaemia. True, muscular hypertrophy after venous thrombosis of a large vein has been observed frequently. It is accompanied, however, with impairment of function. Venous stasis in glandular organs always produces atrophy of the parenchymotous cells, but an exuberant growth of the connective tissue. Diseases stimulating the circulation in growing bone

cause increase in length and thickness of the bone. Such an increase may even take place in the healthy bones of the same extremity. Therefore we may accept Roux's statement as correct when he says that only organs with passive function (supporting tissue and covering epithelia), but never those with active function (muscle, nerves or secreting epithelia) will proliferate solely under the influence of increased nutrition without specific irritation Retarded callus formation in a broken bone is considerably accelerated and strengthened by artificial venous hyperaemia. In tuberculous inflammation we notice an induration of the soft, tuberculosis granulomas and their transformation into scar tissue, usually rather a slow process, sometimes under the influence of passive congestion taking place very rapidly. Penzos' experiments on the effect of active hyperaemia are important; he fractured the ulnas in rabbits, treated one side with heat (100 degrees Fahr.), the other side with cold applications (50 degrees Fahr.). After seven days the bone treated with heat had formed a perfect callus, whereas the bone that was kept cool showed hardly any effort at regeneration. Similar results are obtained with passive congestion; in fact, we may say that function calls for active hyperaemia, growth and regeneration of tissue mainly for passive hyperaemia. The demand for oxygen in function is far in excess of the amount needed for anabolic processes.

Before we take up the practical application of the principles discussed we must emphasize the facts that any remedy, chemical or physical, has a different effect according to the strength of the doses used, and that each individual reacts in its own way. Congestive hyperaemia, for instance, may reduce pain in many diseases if produced moderately, whereas, if carried to excess, it causes intense suffering and paraesthesias.

Nature's reaction on bacterial infection is inflammation. Inflammation causes slowing of circulation, dilatation of the blood vessels, serous infiltration of the tissues and emigration of leucocytes. Passive hyperaemia produces the same results. For practical purposes this rule will hold good. Bacterial diseases should be treated with passive, non-bacterial with active hyperaemia. For tuberculosis of the joints active hyperaemia does harm. Passive congestion has a favorable influence on any tuberculous processes. Tuberculosis is rarely observed in heart lesions, caus-

ing engorgement of the pulmonary circulation. For tuberculosis of the joints and bones passive hyperaemia proves of great benefit. The constriction bandage is the easiest method to produce it. It must be applied once in twenty-four hours, left in situ for one hour. The hyperaemia produced should be quite marked, but should not cause pain, paraesthesias or edema within this short time. Open abscesses must be freed of their bandages during the treatment. Unruptured old abscesses ought to be opened early with small incisions under local anaesthesia. The application of the dry cup is of great advantage to remove the pus. Moderate exercise of the affected limb is advocated. This treatment is contraindicated in amyloid degeneration and severe pulmonary phthisis, where amputation of the limb is demanded. In very large abscesses, having destroyed the joint or where a faulty position of the joint can not be prevented, and where an operation would secure better functional results, surgical interference is imperative. A great advantage of the hyperaemia treatment of bone tuberculosis is the possibility of treating such cases in the dispensary, i. e., by the ambulatory method. The old abscess, that frequently develops during the hyperaemia treatment, never means an extension of the tuberculosis process, provided it is recognized early and treated correctly. For the treatment with dry cups only cases that have a tendency toward softening ought to be selected. The cup should be applied for forty-five minutes. It ought to be left in position five minutes, then removed and reapplied after three minutes, first daily, later every second or third day, finally weekly applications are sufficient. In acute inflammation only a slight vacuum must be produced; in tuberculosis a more energetic procedure is permissible. The results of the combined treatment with constriction bandage and dry cup have been most remarkable; especially as far as the preservation of form and function of the affected limbs is concerned. The same holds good for the treatment of fistulas of tuberculous glands, where vacuum apparatus prove their exclusive usefulness.

The method used to treat acute infection and its consequences differs asolutely from the one advocated for tuberculosis. Here we keep the bandage in situ for twenty-two to twenty-four hours, then remove it for two to four hours, during which time the limb is elevated in order to reduce the extensive edema which has been

produced by the bandage. Eventually slight massage is needed to remove it. Where the bandage can not be shifted from time to time, as on the shoulder or testicles, a shorter application, say eight to ten hours, is indicated. The limb must not show excessive cyanosis; it must remain warm and the pulse must be felt. In acute inflammations of the joints and the phlegmons of tendon sheaths active motions are instituted as soon as pains have subsided. The suppression of incipient acute inflammation by the use of congestion hyperaemia has given me great satisfaction. Where suppuration has set in, a small incision will suffice to remove the pus; no curreting, tamponing or dusting with iodoform is needed. For four cases of acute mastitis of all stages I have seen immediate relief of pain, complete drainage of the abscess, return of the temperature to the normal, and last, but not least, absolute preservation of the milk glands and form of the breast. The effect of the applicatoin of the constrictoin bandage on the course of the temperature in acute septic poisoning has been clearly demonstrated in the case quoted first in this paper. Practically any inflammation may be prevented if the hyperaemia treatment is instituted as a prophylactic measure. There is hardly any germ-born affection that has not been successfully combated by this treatment. The results in gonorrheal arthritis deserve special mention; erysipelas, on the other hand, has given negative results.

Considerable discussion has been provoked by the introduction of the hyperaemia necktie, a rubber woven bandage three-fourths of an inch wide, applied below the larynx, sufficiently tight to produce congestion, even bloating, of the whole head. Acute suppuration of the middle ear, mastoiditis has been cured, with preservation of perfect function. Neuralgic headaches, catarrhal affections of the mucous membranes, antrum affections yield to this simple application. The bandage is worn from twenty to twenty-two hours, and causes very little discomfort.

For the treatment of non-infectious diseases active hyperaemia, especially the different forms of hot air applications, come into consideration, although the constriction bandage can claim good results. Chronic stiffening of joints after rheumatism, arthritis deformans, traumatism or gonorrhea may be mentioned. The resorptive action of hyperaemia is utilized to remove edemas,

serous exudates into the joints and elephantiasis. I mention at last the results obtained by the use of the large vacuum apparatus for the correction of orthopedic deformities, where negative pressure and hyperaemia unite to produce the desired result.

With the introduction of passive hyperaemia as a remedy and the physiological explanation of its effect, Bier has completely revolutionized the time-honored views on inflammation and its treatment. That a sluggish circulation should be preferable to an active one for restitution sounds at first paradoxical, but his results demand at least careful consideration. A large number of affections heretofore assigned to the surgeon will have to be returned to the physician. Another instance of the modern tendency to broaden the limits of the borderland of medicine and surgery.

DISCUSSION.

Dr. Harrold, of Marion: I was very much interested in this paper. It is a revelation as to the common idea of inflammation, and when I first began to think of this treatment it upset some of my plans of treatment. In the first place, elevation was the chief thing when I had an inflammation, and this reverses it. Now, in fact, the word has a double sense—first, increased invasion of the bacteria, and second, the resistance of the body.

There is certainly a great deal of danger in this system, for it is so very easily applied. Now, I have already had experience with that. I had a patient with inflamed glands in the neck. There was a very rapid, progressive inflammation, and I thought I had a good case for this treatment, and I applied it with the most happy results. In four days the inflammation had subsided, and the pain was gone in twenty minutes. This patient told the neighbors about it, and they had strings on their toes and fingers when they had any trouble, but they kept them on too long or had them on too tight, and they had trouble.

I had another case that I used this treatment on with happy results, except for one instance. There was an inflammation of the finger, and I used this method, and it relieved the pain and the inflammation, and this remained so until the patient had got about half way home, and then the pain became intense. He became almost hysterical with pain. I think I did him a little

harm. On the whole my results have been very good. I think, however, when you use this method you should have close supervision over your patient, and you can not let him go away as you did with the old method. Twenty or thirty minutes' time will make a considerable difference with the treatment. It seems to me also that it will revolutionize some of our agents. Antiphlogistine will have to go out of the market or else take on a new name. Possibly prophlogistine would be a good name.

Dr. R. H. Ritter: I do not care to discuss the particular application of this measure, which has already been gone over. Its exceeding simpilcity makes it require no such explanation. I do think we ought to have a very clear conception of the principle underlying the application of such a remedy as this. The question of inflammation has been studied by every doctor, and it has been the greatest subject of pathology aside from tumors and cancers; but today we are coming to a radically different conception of this process. It may be that in a few years we will consider inflammation in connection with physiology and not in connectoin with pathology.

Now, if we are to define inflammation at the present time we must define it as a purely conservative process. When there is an inflammation we have an increased power of resistance. We know in the light of recent investigation that former beliefs in regard to inflammation must be reconsidered. This may seem a somewhat radical statement, but I feel somewhat safe in making it. I will say further that there is not a single sign of inflammation which may be mentioned which does not have a conservative and useful effect. We used to consider inflammation the synonym for all that was bad; but this is not true. Even pus was formerly considered the acme of pathologic evil, but we know now that pus is antiseptic to most organisms except those directly the cause of the trouble. It will not compare with boiling water, but nevertheless it has certain antiseptic properties. It contains certain ferments which digest the dead tissue and secure its removal. And so in a sense the organism becomes accustomed to these things. The exudate, either serous or fibrinous, brings to the part increased nutrition. The fibrin tends to seal up the lymphatics and prevent absorption, and the exudate often

mechanically relieves the conditions, such as the friction of two opposing inflamed surfaces, and it also serves as the framework of new connective tissue which replaces as best it may the tissues lost by the injury.

Dr. Burckhardt: I would like to call attention to these methods, as they do a great deal of good in tubercular bone lesions, and help considerably in afflictions of the joints, also in cases of chronic stiffness, and the method will reduce the parts to their proper proportions. As I mentioned in the paper, you give the patient immediate relief, and he can often leave your office in five minutes after with absolute relief of pain without having to go through a serious operation, as was formerly the case.

BLASTOMYCOSIS AND ITS CONGENERS—REPORT OF EIGHT CASES OBSERVED IN INDIANA.

BY A. W. BRAYTON, A. M., M. D., OF INDIANAPOLIS.

I ask the attention of the surgical section to the reading of this paper on blastomycosis, because it is even more distinctly a surgical than a medical disease, and surgeons ought to be well informed about it. Teachers of surgery, and particularly teachers of surgical pathology, can no more afford to neglect the study and teaching of blastomycosis that they can neglect the study and teaching of the other rare and minor diseases of the great surgical group of the infective granulomata to which blastomycosis belongs, such as actinomycosis, rhinophyma, glanders and leprosy, or even the two most widely prevalent and destructive members of this group—syphilis and tuberculosis.

Historically, it is only half a century ago that syphilis was separated from gonorrhea and soft chancre by Ricord and Basereau, and only recently has actinomycosis been differentiated from sarcoma. And only in the last ten years have the skin lesions known as blastomycetic dermatitis been separated from various forms of tuberculosis of the skin. Dr. Edmund D. Clark, of our society, received in his ward at Johns Hopkins in 1896 the first known case of the skin disease studied by Gilchrist at Johns Hopkins and named by him blastomycetic dermatitis, and Dr. Clark now has in charge my last case out of eight that I have seen in Indiana, under surgical treatment at St. Vincent's Hospital in this city. Gilchrist's case was first regarded by Dr. Duhring and others as a case of verrucous tuberculosis of the skin.

Since then upwards of a hundred cases have been recognized in the United States, over half of them in Chicago, nearly a score of allied cases in California, and eight or nine in Indiana. Some of the cases were sufferers for ten years; some were cured by iodide of potash; most by the knife, the sharp spoon, and the

Paquelin cautery. In twenty of the cases the disease became generalized and the patients died of what was mistaken, both ante mortem and post mortem, for ordinary bacillary miliary tuberculosis, but was afterwards found to be a true yeast produced tuberculosis; that is, a miliary blastomycetic or coccidioidal tuberculosis of the lungs and other internal organs.

Indeed, it is quite probable that the general dissemination of the yeast organisms to the internal organs, resulting in death, has occurred as a result of the scraping or dissection of the blastomycetic areas. I think that in one of my cases with large lesions that were cureted freely, the yeast cells may have been taken up by the lymph or blood vessels, inasmuch as sinuses developed in the area scraped off. The knee and popliteal space became involved, requiring amputation above the knee in order to save the patient's life.

Whether the lesions produced by the yeast fungi are entirely in the skin, or whether primarily internal, or whether first upon the skin and then passing to the internal organs, as has usually been the case, the lesions of blastomycosis have been generally regarded from their gross appearance and their clinical course as ordinary tuberculosis, and yet in any single given case the diagnosis may be readily and quickly made by examining the tissues for the organisms which produce the lesions, for these organisms are invariably present and can be inoculated in or upon the lower animals.

Therefore the consideration of blastomycosis is no longer the consideration of a rare skin disease producing merely discomfort and destruction of limited areas of the skin, such as occurs with lupus or verrucous tuberculosis, but is a sister disease of ordinary tuberculosis, differing mainly in its rarity, in its primary selection of the skin rather than of the lungs and other internal organs, and in the nature of the organisms which produce it. Probably it is as old a disease as tuberculosis or syphilis, and that is to say it is as old as human history.

The disorder has been called the Chicago disease, because more cases have been reported there than from any other center in the world, although the studies of the first case were made by Busse and Buschke in Germany, of the second by Gilchrist of Baltimore, and of the third by Hessler of Indianapolis. But in the last five

or six years the literature of blastomycosis has grown to nearly as many papers as there are cases known, enough to make a thick volume from Chicago alone.

Mainly through the work of Hyde and Montgomery, who have seen over fifty cases, blastomycosis is now generally recognized as an entity, and Gilchrist's name for the skin disease, blastomycetic dermatitis, is widely adopted. But the occurrence in Chicago of cases in which the viscera as well as the skin were affected, and even of cases in which the skin was secondarily attacked, and of several cases which progressed to death in which the skin had first been infected for several years, followed later by systemic infection, has taken the disease out of the field of dermatology and placed it where it belongs, among the infectious granulomata, with such close clinical alliance to tuberculosis that, as stated above, both the cutaneous and visceral forms have been until very recently confounded with that disease.

Most of the cases have been males in middle life. Of the eight cases seen by the writer, six were males from twenty-five to sixty years of age; one a woman of twenty-seven years. The present case now in St. Vincent's Hospital is a girl of nine years, and as far as I know the youngest case reported, although there is a case, I am told, to be reported at the coming meeting of the A. M. A. at Atlantic City, in an infant.

Of the cases seen by the writer, the first is a "reminiscent case" sent to the Indianapolis City Hospital over ten years ago by Dr. Kemper, of Muncie, before Gilchrist's observations on the Johns-Hopkins case, which, as stated, was in Dr. E. D. Clark's care at the Johns-Hopkins Hospital in 1895-96. The lesion was on the scalp; it was a circular patch four inches in diameter, and had all the clinical features of the disease as we know it now upon the skin. The description of it will suffice for all the cutaneous lesions of the disease. The lesion was a circular ulcer on the vertex of a man of sixty past, with irregularly massed verrucous and thread-like proliferations, slightly elevated as a whole, smoother and brawnier in the center where the hair and skin were destroyed. The edge of the patch had an elevated border sloping to the unaffected skin, its outer surface presenting small abscesses—the seat, as we know now—of the budding organisms known as "blastomycetes," which are the real cause of

the disease as the tubercle bacillus is of the various tuberculides of the skin.

These blastomycetes are double contoured organisms, not dissolved by potash solution. They show budding outgrowths, the daughter cells smaller or as large as the parent cell. It is the rapid or slow growth of this yeast plant through the skin and other tissues which determines the progress and gives the various clinical pictures which the disease as an entity presents, and which has resulted fatally in over one-fifth of all the cases so far reported.

In this first case seen by me I eliminated epithelioma and syphilis easily enough—the former because epithelioma is not attended with productive papillary and warty growths. Syphilis had been excluded by the history and the therapeutic test of potassium iodide. The observation of Dr. Bevan, of Chicago, that iodide of potassium internally has an inhibiting influence upon the growth of the yeast organism but does not cure it completely, was of course not at that time known. We know that potassium iodide restricts the growth of actinomycosis in man and the lower animals, but does not cure it. And we know also that the salts of mercury inhibit the growth of the spirochete now believed to be the cause of syphilis; but we do not know that mercury destroys it completely; indeed it is quite likely that the organism of syphilis, like the bacillus of tuberculosis, is present in the individual from the time of its reception to the time of death from whatsoever cause. Therefore I rested in the belief that the lesion on the old man's head was an aberrant form of cutaneous tuberculosis, not lupus—which is a disease of childhood, and which is so rare that we do not see a case oftener than once a year in Indianapolis—but a verrucous tuberculosis.

The fault here, as always in hurried practice, was in not making all the tests known to our art, and so it fell to Dr. Hessler, who did make these tests, instead of the writer, to first find in Indiana, and independently of the work of previous investigators, the now well-known organism of blastomycosis. Suffice it to say, for my part in this reminiscent case, in the words of Ambrose Pare: "I treated him, and God cured him." The lesion was thoroughly destroyed, and the patient went on to convalescence.

(Since writing the above I have seen Dr. Kemper, whose mem-

ory is that the disease recurred, but that the patient died of some intercurrent affection. I have also seen Dr. C. E. Cottingham of Indianapolis, who was physician of the City Hospital in 1895 and 1896, and states that he treated the patient two months with mercury and potassium iodide with little change, but that he improved after curetting the area, only to relapse, and becoming dissatisfied, went to his home.)

The second case I saw was Dr. Hessler's, which was reported in the Indiana Medical Journal of August, 1898. It is the only case in the literature whose history from beginning to end was under constant observation by a trained pathologist. I was asked to see it, as the hard nodule simulated the initial lesion of syphilis. It was on the chin of a healthy male, following a razor cut. The source of the yeast is not known in nature; the patient dealt much in nature studies, and was much exposed to any wild pathogenic yeast of the country. This yeast must be widely distributed, as cases are known from most parts of the world, but most cases have been about Chicago; they may follow civilization, as other pathogenic organisms do. This yeast was isolated by Dr. Busse in 1894, from an abscess on the tibia of a woman of thirty-four. She developed general lesions and died five months after the operative procedures, from general blastomycosis, the autopsy showing foci of the disease in the bones and internal organs, from all of which the blastomycetes were cultivated.

Gilchrist's yeast and Hessler's yeast were essentially the same organism, known as the Saccharomyces Busse, and such is in general and cultural morphology the kind of yeast found in all the Chicago and Indiana cases. I may say in passing that all the Middle West cases are clinically similar as affecting both the skin and the internal organs, and that generally speaking the lesions are in gross pathology very similar to those of tuberculosis.

The entire Middle States group also resemble closely, both clinically and pathologically, the group of twelve cases reported from California, the first two cases by Rixford and Gilchrist in 1894, and others by Montgomery of San Francisco and by Moffit and Ophuls, of the University of California. Ophuls has summarized the history of each of these cases, including the case of Wernicke and Posodas in Buenos Ayres in 1892, thirteen in all, in the Journal of the American Medical Association, October 28, 1905. All of the cases died.

Among Ophul's conclusions as to the California cases are the following: "The lesions produced by this California fungus—the coccidioides immitis—of Rixford and Gilchrist, also fall under the general head of the infectious granulomata. They consist partly of nodules resembling those produced by the tubercle bacillus, and partly of well defined chronic abscesses. The adult forms of the parasite are more apt to produce nodules, the sporulating forms, abscesses. The fungus is pathogenic for dogs, rabbits and guinea pigs, and probably for other animals also, and in them produces lesions very similar to those which we encounter in the human being in this disease."

The parasite is not a protozoon, but a mould, as shown by Ophuls. They are rounded protoplasmic masses, twenty to eighty microns in diameter, surrounded by a thick enveloping membrane. They multiply by a series of bi-partitions within the membrane: the latter burst and set free the young parasitic elements which grow in situ, or are carried away by the blood and lymph vessels to become the origin of other foci of the disease.

Ophuls has probably seen twelve cases in so short a time—three in one year—because, as Dr. Ryfkogel says, "he was looking for them." The California cases were called by Dr. Ophuls, Coccidioidal Granuloma. There has been no epidemic outbreak. Only thirteen cases have been observed in thirteen years, and all are dead. Probably there have been many others, but as only a few physicians in the West were looking for the cases, or knew them when they saw them, they have been overlooked. Just as in Chicago, Montgomery has seen fifty cases of the form common in the Middle States; just as I, with my limited opportunities for clinical oservation, have found seven cases and recognized them by their gross clinical presentation in my office or in the college and hospital clinics in the last ten years; just as Ophuls has seen so many cases of protozoic dermatitis, as the skin lesions are called in the California cases, and has shown that they all finally become general and fatal—just so other observant and patiently differentiating clinicians should be able to identify and report cases of yeast disease as they arise. For I am fairly convinced that the cases are more frequent in Indiana and elsewhere than they appear to be. There may be physicians here present who, like myself, have cauterized cases of cutaneous

blastomycosis and cured them, under the belief that they were "lupus," or "rodent ulcer," or "cutaneous epithelioma," or "abherrant cutaneous tubercular lesions," when the briefest microscopic examination of the blood, pus or tissue in potash solution, under the one-sixth objective, would have promptly revealed the blastomycetes which are the cause of the disease.

The instances of mistaking blastomycosis for tuberculosis emphasizes the great value of the routine microscopical examination of the tissues in autopsies. The patient and laborious series of autopsies, forty-two in number, made last year by Dr. Charles F. Neu, of our society, late pathologist to the Central Indiana Hospital for the Insane, and published in the Annual report for 1906, are complete in this respect and represent the acme of post mortem work and records as yet attempted in Indiana.

But cui bono? What is the use? I fear the utilitarian philistines of our profession, who distrust pure science, will say: We cut the diseased tissue out, and our patients get well, and what more do we or our patients need or desire?

Ah! there's the pity of it! And yet it is true that all of the enormous accomplishments in applied science and trades of the present—the fact that we are here without the aid of the fleet hoof or the winged ship, as the founders of our society traveled —is made possible by a few men who did pioneer work in chemistry and physics, in biology and physiology, without a thought of any practical application of their researches. "Let us forge ahead," says Agassiz; "the bread and butter men, the practical men, will be close on our heels."

At the recent winter meeting of the Indiana Academy of Science, December, 1906, Dr. Robert Hessler, of Logansport, read a paper on milk sickness, or the "trembles," in which he gave an account of a five years' search for the cause of this now practically extinct native disease which has always been so mysterious and which was such a terror to the early settlers. The disease was known under the name of "trembles" when occurring in animals, and as "milk sickness" when occurring in human beings after the use of milk from an infected animal, or after eating the flesh. The cause, Dr. Hessler believes, is an undetermined species of sterigmatocystis—a fungus of the class Ascomycetes. The organism was found in the blood of an infected horse,

both as free spores and as small yeast-like bodies enclosed in leucocytes. The former disappeared in the course of a few days, while the latter kept on increasing, but later on diminished and disappeared by the time the disease subsided. Another horse similarly affected died and was buried before the true nature of the affection was recognized—before the physician heard of it. All tube inoculations from the blood developed pure cultures; growth develops abundantly on all kinds of media.

Dr. Hessler states to me that he still has the fungus, now (May, '07) under cultivation, and is preparing to inoculate some calves, so as to verify the yeast organism, which he thinks was abundant in certain areas—farms and pastures—but in the progress of drainage and cultivation is now found only in very limited areas.

The current issue of the Journal of Infectious Diseases for April, '07, contains the most complete description with plates yet given of the termination and post mortem findings of a case of systemic blastomycosis. The report is made by Drs. E. R. LeCount and J. Myers, of Chicago. The first report of this case by Eisendrath and Ormsby may be read in the Association Journal, Oct. 7, 1905, p. 1045. This is the seventh death from the disease, and the seventh autopsy. The following note is from an abstract in the A. M. A. Journal.

This case concerns a man aged 33, presenting the symptoms of generalized blastomycosis, with most pronounced localization in the skin, subcutaneous tissue and lungs, and in whom there developed, after some time, a gibbous opposite the fourth dorsal vertebra, with subsequent paralysis, death occurring two years and a half from the onset. After death there was found a blastomycotic bronchopneumonia, blastomycosis of the peribronchial lymph nodes, the pleura, retropharyngeal tissue, liver, kidneys, colon, dorsal vertebrae, spinal dura and cerebellum, elbow, knee and ankle joints, and also of the skin and subcutaneous tissue, in which there were ulceration, fistulae and scars. In the cerebellum there was a conglomerate blastomycotic nodule, in which the organisms, present in large numbers in all the lesions, appeared to be reproducing themselves by sporulation. So far, sporulation has been regarded as not taking place in the tissues in blastomycosis, which differs in this respect from the cocci-

dioidal disease of California, an outstanding feature of which is the large number of sporulating fungi in the tissues. In this case there was also a definite blastomycotic focus in a peribronchial lymph gland. The colon was the seat of certain remarkable nodules which the authors regard as blastomycotic, in spite of the failure to find in them blastomycetes. The case shows that as the observations of systemic blastomycosis multiply, new anatomic localizations and other features are constantly being added to those previously recorded.

THE CASES OF BLASTOMYCOSIS OBSERVED BY THE WRITER.

The writer has observed the following cases of blastomycosis in Indianapolis:

Case one is reported in the paper above. Case two was seen with Dr. Robert Hessler, and reported in the Indiana Medical Journal of August, 1898. It was on the chin of an adult male. The differentiation of the nodule, which was the size of a bean, was from the hard chancre. Dr. Hessler cultivated a yeast from the lesion, which was identified by Prof. Welch, of Johns Hopkins Medical School, as the same as that found by Gilchrist and described by him in the Johns Hopkins Hospital Reports of 1896. The nodule was thoroughly curetted and cauterized, followed by complete recovery. At that time but seven cases were recorded in man; six of these were in America, Dr. Hessler's being the third case published in this country.

Case III—The third case seen was that of a hostler of Indianapolis, Samuel Plumber, aged fifty; diagnosed by the writer in the clinics of the Bobbs Dispensary in the Medical College of Indiana. This was the eleventh case reported in the United States. The lesion developed November, 1898, on the proximal phalanx of the right middle finger, as a small nodular erosion, painful from the beginning. In three months the sore was the size of a bean; in October, 1899, as large as a nickel, when it was regarded as an epithelioma by the late Dr. L. A. Malone, and cauterized by him, but recurred and was exceedingly painful.

Prof. Catherine Golden, mycologist in Purdue University, made cultures at my request in February, 1900, finding the yeast organism, and making many photographs of it. Dr. W. T. S. Dodds,

March, 1900, made cultures of the yeast on wort gelatin, which were sent to several laboratories in the United States and Europe, and also to Drs. Hyde and Hektoen, of Chicago, and Gilchrist, of Johns Hopkins. In spite of deep curetment and use of caustics, the growth recurred, involving the joint and causing intense and constant pain. I therefore removed the growth, cutting wide outside the margins. There was partial healing, followed by recurrence deeper in the tissues, and involving the metacarpo-phalangeal joint. At the patient's request, and as a means of preventing general systemic infection, Dr. H. K. Langdon at the City Hospital removed the finger and joint. The specimen was exhibited by photographs, tissue sections, and the growing yeast from the lesion at the Atlantic City meeting of the American Medical Association. The patient had no recurrence, and is now in good health.

Based upon the pain, which I think is unusual in purely cutaneous blastomycosis, and upon the clinical symptoms, I presented this and other cases in the Journal of the American Medical Association of February 1, 1902, under the title: "The Immediate Diagnosis of Blastomycetic Dermatitis," and also presented the method of immediate recognition of the yeast cells as detailed by Dr. Dodds and copied by Dr. Stelwagon in his "Diseases of the Skin," 1902, page 1059, as follows:

"A small bit of tissue from the advancing margin is placed upon a glass slide, washed with ether for two minutes to remove fats: it is then macerated in a twenty per cent. potassium hydrate solution for five minutes, and then examined with a one-sixth to one-twelfth objective for the yeast cells."

Case IV—Case four occurred on the front of the shin bone of a Federal veteran, a farmer aged sixty years, growing from a small papule to the size of the palm in two years. He was referred to me by Dr. H. R. Lowder, of Bloomfield, Indiana, August 1, 1901. The growth was proliferative. There were thousands of projections matted together and flattened down by constant bandaging; these were an eighth to a sixth of an inch above the level of the lesion.

At the margin was an elevated, inflammatory and painful border. The yeast cells were readily determined in the lesions. Tissue and pus plantings readily developed the growths, which were also

found in the sections by Dr. Dodds. The patient was referred back to Dr. Lowder, who removed deeply the entire growth, followed by recovery.

This case was remarkable for its resemblance to the colored plate of Dr. Morrow's case of tuberculosis papillomatosis cutis in the Journal of Cutaneous and Venereal Diseases, of November, 1898. The warty proliferations of Morrow's case examined by Dr. George T. Elliot, showed tubercle bacilli. They were not found in Plumber's case, nor was there any tuberculosis elsewhere in the patient nor in his family.

In the second reported systemic case, that of Walker and Montgomery, of Chicago, there was cutaneous blastomycosis several years preceding the systemic involvment. The patient was operated on, curettage and cauterization being employed. Nine days after the operation there was fever, inanition, emaciation with dyspnea, the patient dying in six weeks. Dr. Montgomery had treated this case several years before blastomycosis was recognized by Gilchrist and Busse, and it was classed by him as an unusual form of cutaneous tuberculosis. At the post mortem the patient was believed to have died of acute miliary tuberculosis. Later both Walker and Montgomery, learning about blastomycosis, recalled the case, examined their old slides, both the ante mortem and the post mortem, and independently recognized the condition as one of cutaneous and of visceral blastomycosis, respectively.

In the third systemic case, that of Ormsby and Miller, of Chicago, the patient's history and symptoms were those of tuberculosis, but all the clinical features were negatived by patient laboratory researches on the patient, both before and after death, by Drs. F. I. Otis and Newton Evans, with always present the budding yeast organism, and always absent the bacillus of tuberculosis. It is of interest to note that one of the operators at the autopsy was inoculated with and shortly after developed a cutaneous blastomycosis.

Case V—On June 15, 1904, Mr. Leroy F., of Anderson, Indiana, consulted Dr. Dodds about an extensive skin lesion which encircled the dorsum of the foot, ankle and calf of the left leg. Dr. Dodds asked me to see it with him, and we both readily recognized the lesions clinically as those of blastomycosis.

Dr. Dodds says: "The lesion had its origin in a blister which was caused by his boot rubbing the ankle while plowing. The lesion spread from an area the size of a ten-cent piece to an extent sufficient to encompass the above described areas. The lesions advanced by an elevated margin, with a tendency to heal in the center. The central portion of the lesion was covered with dry scales, which had become coalesced, forming scabby elevation. The clinical picture of the lesion was characteristic of cases seen in this city by me with Dr. Brayton, and demonstrated to be of blastomycetic origin. Sections of the advancing margins were taken for microscopical examination, and cultures made, which proved the case to be one of blastomycetic dermatitis.

"The patient was operated upon at the Deaconess Hospital in the latter part of June, 1904, by scraping all of the verrucous growths, together with the advancing margins, well down through the diseased skin. The lesion was burned over very thoroughly with the Paquelin cautery and dressed with dry antiseptic dressings. The wound healed very well in the course of three or four weeks, and the patient was discharged, apparently cured.

"Three or four months later the patient returned with the characteristic lesions surrounding the external malleolus, together with a sinus which led to the dorsum of the foot, and which showed the yeast cells abundantly. There was also extensive involvment of the lymphatics extending up the leg to the popliteal space. The extension of the disease at this time was so great as to make necessary an amputation above the knee, which was advised, and the patient referred back to his surgeons in Anderson.

"After the amputation I lost track of the patient, and have no further record of his case, although I have heard that there was no further recurrence of the disease."

Case VI—The sixth case observed in this city was that of a woman, Mrs. S.. of twenty-seven years, in whom the lesions were located at the metacorpo-phalangeal junction, and with several satellites caused probably by the infection of sebaceous follicles on the finger and extending up the edge of the palm. In each of these the yeast was found by the writer. The pain suffered by the patient was intolerable, especially intensified at night. She

had been advised to have the finger amputated, under the belief that the lesion was either lupus or epithelioma, but in any case regarded as malignant. She was referred to me by her uncle, Mr. W., an attorney of Indianapolis, for final diagnosis.

The patient was put under anaesthesia and the lesion thoroughly curetted and cauterized with the Paquelin cautery, the operation resulting in complete recovery. This case was seen by a number of the members of this society—Drs. Dodds, Potter, Wishard, Wynn, and others. Her occupation was that of housewife, the primary lesion having existed for several months, beginning as a small pimple which later became an ulcer with well-defined margins, but with a raw surface, probably due to the constant use of chemical irritants which prevented warty growths, but were not sufficiently powerful to destroy the yeast cells and abscesses at the margins, by which the disease constantly progresses. I am satisfied from my study of this case three weeks before the operation, that the point of entrance was about the hair follicles or sebaceous glands.

Case VII—The seventh and final case is the youngest so far reported of this disease, that the writer knows. A girl of ten years of age, weighing eighty pounds, plump and well-nourished and in apparently good health, with the exception of an epilepsy which is controlled by the use of bromides. She was referred to me by Dr. Simison, of Romney, Indiana, a member of the House of Representatives in the last Legislature, and was under the immediate treatment of Dr. Ora L. McCay, of Romney, who gave me the history of the case.

The first lesion was noticed last August, and in the last days of February, at the time I saw her at my office, extended completely around the leg midway between the knee and ankle, with all the characteristic gross appearance of blastomycetic dermatitis, notably a great number of soft, warty growths scattered over the surface of the lesion, and with the well-defined extending margin described above.

She returned to her home and was instructed to dress the lesion with aristol or iodoform bound down with dry bandages. After six weeks she returned to Indianapolis and was sent to St. Vincent's Hospital and placed under the care of Dr. Clark, who saw the case with me. I took particular pleasure in turning the

surgical treatment of this case over to Dr. Clark, as he had had the care of the first case reported in the United States, and furthermore because blastomycosis is a disease that belongs to the surgeon quite as much as to the physician.

Under the use of the dry dressings the lesion had very much improved, the center had become red and brawny; most of the warty proliferations had disappeared, and all of the small lesions scattered about the main lesion above described were cured. Dr. Dodds and Dr. Ferguson examined this case in the office at her first visit, and at once demonstrated the yeast cells in the pus and in the teased fragments which were cut from the margin of the ulcer.

Under ether anesthesia Dr. Clark curetted and cauterized the external margins and greater surface of the affected area, and for two weeks she seemed to be progressing rapidly towards cure, when much to the surprise of the writer, Dr. Clark reported that the central portion, which had not been curetted or cauterized, had broken down, behaving in the same manner he had observed in Dr. Gilchrist's primary case.

In April, under anaesthesia, Dr. Clark dissected the entire skin to the subcutaneous fat, as the only proper method of complete destruction of the lesion. Unless there has been some untoward extension of the yeast growth into the deeper tissues with the implanting of a possible general systemic blastomycosis, we may reasonably expect this girl to recover under the final operation. (The girl recovered and left the hospital May 21.)

The previous writings of the author upon Blastomycosis are as follows:

1. Blastomycetic Disease in Indianapolis. Indiana Medical Journal, July, 1901, p. 34.

Contains note of three cured cases in Indianapolis, and statement of death by systematic invasion of Dr. F. H. Montgomery's second case in Chicago.

2. Frequency of Blastomycetic Dermatitis. Preliminary Note of a Fourth Case Observed in Indiana. Indiana Medical Journal, August, 1901, page 78.

Contains note of case from Bloomfield, Indiana, resembling Morrow's case of tuberculosis papillomatosa cutis. Also remarks upon the similar case of Ryan. Ryan's case was seen by the writer in 1898, at the City Hospital, and diagnosed as verrucous tuberculosis. The primary patch was on the instep, two inches in diameter; the proliferations crowded together like the ends of a bunch of matches, and one-fourth of an inch long. There was a later patch at the margin of the anus, from infection by scratching. Both patches were curetted by Dr. N. E. Jobes, Superintendent of the City Hospital, but recurred. Later Ryan was put on potassium iodide by Dr. George Beasley, of Lafayette, who regarded the lesions as tertiary syphilides. The areas were greatly reduced, but not cured. The iodides were continued when Ryan later returned to the hospital, but without cure. Water color drawings of this case were made for me by Otto Stark, of Indianapolis.

There is now no doubt in my mind that this was a case of blastomycosis, though having the appearance of tuberculosis papillomatosa cutis. With this view Dr. Roscoe H. Ritter, of Indianapolis, who studied the case at the hospital while an interne, coincides. After I learned of the yeast disease, I searched for Ryan, but was not able to locate him.

3. The Immediate Diagnosis of Blastomycetic Dermatitis. Indiana Medical Journal, November, 1901, pp. 163-7.

This paper is a review of the subject as presented at the May meeting of the American Dermatological Association in Chicago. Then seventeen cases were known, Hessler's being listed as the fifth, and Brayton's the eleventh.

Dr. F. H. Montgomery reported additional cases at this meeting (the 14th, 15th and 16th), and Dr. Dyer, of New Orleans, the 17th case. It is to be noted that ten of the seventeen cases were by Chicago physicians, including such men as Hyde, Senn, Hektoen, and Montgomery. But in the discussion Drs. J. C. White and J. T. Bowen, of Boston, and Drs. W. A. Pusev and Joseph Zeisler, of Chicago, contended that the disease was tuberculosis of the skin, the yeast organism being only a secondary complication, the cases not as yet having been shown to conform to Koch's postulates as to the entity of an infectious disease. Dr. J. C. Johnson was inclined to agree with Drs. Bowen and Zeisler, be-

cause of the unusual picture the new disease presents of exudative inflammation with pus existing side by side with proliferating tubercles, but inasmuch as Dr. Welch had told him he had no doubt of the pathogenecity of the yeast growths, he would in deference to Dr. Welch withdraw his objection to their causal relationship to blastomycetic dermatitis.

This paper is an argument for the entity of the disease; of the differentiation from tuberculosis of the skin, syphilis, and epithelioma, and the method of identifying the fungus together with emphasis of the pain in the ulcerative forms of blastomycosis.

4. Immediate Diagnosis of Blastomycetic Dermatitis. Read before the section in Cutaneous Medicine and Surgery, at the St. Paul meeting, 1902, and printed in the Journal of the American Medical Association, February 1, 1902.

This paper includes the subject matter of the preceding paper, with the report of the case sent for diagnosis by Dr. H. R. Lowder, of Bloomfield.

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5. Several Unusual Cases of Skin Disease Observed in Indianapolis: Refractory Subcutaneous Abscesses, probably due to Sporotricha; Blastomycetic Dermatitis; Herpes Gangrenous; Xanthoma Tuberosum; Ichthyosis Simplex; Tinea Favosa; Palmar and Plantar Keratosis in Four Generations; Idiopathic Multiple Pigmented Sarcoma; Dermatitis Herpetiformis; Leucokeratosis Buccalis; Xeroderma Pigmentosum, three cases in one family.

This paper appeared in the Indiana Medical Journal of April, 1900, pp. 401-12. Three (3) pages are devoted to blastomycosis. It includes the Plumber case, and also contains an account of Dr. Senn's case, which he at first regarded as tuberculosis of the skin. At that time, to quote Hektoen, "the diagnosis generally wavered between tuberculosis of the skin and epithelioma."

This paper contains notes of several of the early cases from the current literature, mostly emanating from Chicago, the "storm center" of the disease as occurring in this country.

To the above should be added the following paper:

Blastomycetic Dermatitis. Report of a Case by Robert Hessler, A. M., M. D., of Indianapolis, in the Indiana Medical Journal for August, 1898, pages 48 and 49.

Dr. Hessler was at the time pathologist to the Central Hospital for Insane, at Indianapolis. The case was reported by the write-

of this note to the skin section at the Denver meeting of the American Medical Association.

This case, Dr. Hessler believes, resulted from a razor cut just under the chin, October 15, 1897. The patient was a healthy man of 28 years of age. The cut healed over in a few days, but was followed by an oval red papule the size of half a grain of wheat, hard, red, elevated and movable under the skin. January 10th the area was inflamed and red, the size of a quarter, but in a day or two the nodule suppurated. The surface was cleaned, opened, and culture tubes inoculated and smears made, but no pus forming organisms were found. A few hours later, by gentle pressure, blood and pus appeared, from which smears were made and reserved. A week later the culture tubes developed a pure yeast growth in the budding stage, from which many generations were grown on various media. On glycerine agar the growth was a pale white mass consisting of a dense network of fibers with cells of various sizes. In hanging drop cultures the daughter cells grew to full size in half an hour. In fluid media the growth stopped at the budding stage. In solid and desiccated media the fungus threads appeared after several days or weeks. The growth was slow or absent in glucose solution, but abundant on addition of a little beef extract, but without the formation of carbonic acid.

The organism was smaller than that of Gilchrist. Slides of cultures sent to Prof. Welch, of Johns Hopkins, were pronounced by him to be blastomycosis.

The lesion was cauterized with carbolic acid and destroyed, leaving a glazed, well marked cicatrix over the site of the nodule.

(Note). Dr. Hessler's case is notable as being the third case recorded in this country. The patient was a healthy adult twenty-eight years of age. The persistence of the research for other organisms by Dr. Hessler, upon finding that there were no pus-forming organisms, was fortunate. It is also notable as being the only case on record whose history from beginning to end was under constant observation. The yeast cultures were kept for over a year by Dr. Hessler, and may be living yet. The vitality of yeast is remarkable. Hansen obtained growths from cultures twelve years old. Busse got luxurious growths from potato cul-

tures seven years old and "almost as hard as a bone." The writer of these notes has grown the organism of tinea versicolor after ten years of desiccation, and the vegetative organisms of other parasitic fungi are probably not less persistent in vitality. The yeast organism of blastomycosis found by Busse, Gilchrist and Hessler was isolated by O. Busse in 1894 from the tibia of a woman thirty-one years of age, who died of the disease in thirteen months. The autopsy developed nodules on the bones, and in the lungs, skin and kidneys. This yeast is not known in nature. It was cultivated from all the foci in this case, which is the first one of generalized blastomycosis known. It was published as the Busse-Buschke case in Virchow's Archives in 1895. The position of the yeasts in systematic botomy has not been accurately determined.

The attempt to connect the growth of cancer with blastomycetes, because of a certain similiarity between the yeast cells and the cell inclusions of the structures called by Sanfelice and his pupils the "parasites of cancer" is not now given credence. Tumor-like nodules are, however, often formed at the site of inoculation and in the internal organs when yeasts are injected into various species of animals.

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GENERAL CONSIDERATION OF OPSONINS.

BY JEWETT V. REED, M. D., OF INDIANAPOLIS.

Artificial immunity in some of its forms has been employed since the earliest times. Many primitive races employed vaccination against snake and scorpion venum by injecting extracts of these poisons beneath the skin, and also against the pleuro-pneumonia of cattle by incising the skin wtih a knife that had been plunged into the lung of a diseased animal. The inoculation with the virus of smallpox as a protective measure has been known since the 11th century, but was not introduced into Europe until the 18th century. The fact that inoculation with the virus of cowpox confers an immunity against smallpox was commonly known among the breeders and dairymen of Europe centuries before Jenner brought it into general use. The careful investigation of this subject by Jenner in 1798 marks the starting point in the scientific study of immunity.

Pasteur about eighty years later, in studying the relations between infectious diseases and micro-organisms, demonstrated that fowls could be protected from fowl cholera by injections of attenuated cultures of the causative organism; and thus established the fundamental principle that micro-organisms and their viruses can become attenuated and thus serve as protective vaccines. Following up this principle he was able to immunize animals against anthrax and rabic virus.

Stimulated by the work of Pasteur and his followers, a great army of workers appeared in the field, and in a short time immunization was produced for many of the infectious diseases. It was impossible for work to be done, of such far-reaching interest, without many theories being put forth as to the mode of production of the immunity. The most plausible of these was the phagocytic theory brought forward by Metchinikoff in 1882. He set forth the idea that the leucocytes of the blood and various endothelial cells wander to the site of infection and ingest the

invading organisms; and that in the immunized state both the number of phagocyting cells and also the ingesting capacity of each cell is increased.

In 1890, following the discovery of the diphtheria antitoxin by Behring and the tetanus antitoxin by Kitasato, the explanation of the mechanism of immunity began to revolve about humoral theory. It was found that these antitoxins could neutralize the corresponding toxins either in the living animal or in the test-tube, without the intervention of phagocyting cells. In many ways these antitoxins behaved like definite chemical compounds. Ehrlich, the chief of the humoral school, formed a good working explanation of these reactions in his side chain theory.

The simple neutralization of toxins by antitoxins can be applied to diphtheria and tetanus only, as these are practically the only organisms that produce strong, soluble toxins. In most bacterial infections the organisms develop in the tissues generally, and hold their toxins in an intracellular combination. Pfeiffer, in the phenomenon bearing his name, demonstrated the bactericidal action of immune sera; and Bordet showed that this bacteriolysis was brought about by the action of two substances in the serum, the immune body and the complement. Ehrlich with great ingenuity brought this into harmony with his side chain theory.

The contest between the humoral and phagocytic theories of immunity waged long and bitter. The supporters of the former disregarded almost entirely the action of the leucocytes, ascribing to them the function of scavangers only. Metchinikoff, the chief advocate of the phagocytic theory, not being able to disregard the existence of important substances in the immune serum, held that these substances were in the nature of secretions from the leucocytes.

The work of Sir A. E. Wright and Captain Douglas has in a large measure shown that both the leucocytes and also certain substances in the serum take part in overcoming bacterial invasions, thus to a certain extent reconciling the two schools.

In 1895 Denys and Leclef showed that serum from an animal immunized with streptocci, when mixed with leucocytes and an emulsion of streptococci, the white cells took up more cocci than when normal serum was used. Later, Leishman, on similar lines,

devised a method of accurately measuring the phagocytic power of blood outside of the body. Following up this work, Wright and Douglas have put the practical application of the principle of immunity on what seems to be a rational basis.

In many diseased conditions of the body there is a reaction on the part of the tissues tending to overcome the primary pathological process. The cells and fluids of the body not only possess the power of regeneration but in many instances they are able to produce substances capable of neutralizing injurious foreign elements which may have gained entrance to the tissues. The most important products resulting from these conservative reactions are antitoxins, agglutinins, precipitins, lysins and opsonins.

The antitoxins are probably the simplest form of antibodies. They are formed as the result of entrance of soluble toxins into the body, such as the toxins of the diphtheria and tetanus bacillus, snake venom, and the vegetable toxins abrin and ricin. The explanation of the formation of antitoxins, according to the side chain theory of Ehrlich, is as follows: The proteid molecules of the cell possess side chains of affinitives which serve to combine with food molecules floating in the surrounding fluids. Animals susceptible to certain toxins possess side chains with an affinity for the toxins as well as for a food molecule. When the toxins combine with the side chain the latter immediately separates itself from the proteid molecule, thus neutralizing the combining affinity of toxin and also at the same time removing it from the main proteid molecule. Later new side chains are produced to replace those given off in combination with the toxins and, following the general law that in many forms of regeneration the new-formed elements are in excess of the number actually needed, the new side chains are in greater numbers than the proteid molecule requires. This excess of side chain radicles is thrown off into the surrounding fluids and constitutes the antitoxins. In other words, antitoxins are nutritive radicles that have become separated from the main proteid molecules, and are floating free in the serum. While most antibodies are more complex in their actions than antitoxins, their mode of formation is probably the same in all cases.

The agglutinins are antibodies found in the serum of both normal and immunized animals, and possess the power of clump-

ing and destroying the motility of certain bacteria. Their action is specific, but very little is known as to the manner of their production. The agglutinins probably play an important part in the production of immunity; however, the degree of immunity often varies greatly from the amount of agglutinins present.

The precipitins are antibodies somewhat of the nature of antitoxins and are formed as the result of injecting foreign proteid into the tissue. The serum containing the precipitin has the power of throwing down the corresponding proteid in a test-tube. This reaction is fairly specific for the various forms of proteid. The role played by the precipitins in immunity is probably very slight, however they may be of importance in proteid metabolism.

The lysins constitute a large class of antibodies which have a specific disintegrating action on various types of cells, both tissue cells and unicellular-organisms. The bacteriolytic phenomenon was first demonstrated by Pfeiffer in the following manner: Guinea pigs were immunized against the cholera vibrio by injecting attenuated cultures of this organism. The serum from these guinea pigs produced a disintegration of the cholera vibrio, either in the peritoneal cavity of the animal or in the test tube. Bordet found that on heating this serum to 55 degrees C. its lytic action was lost, but immediately returned on adding serum from a normal nonimmunized animal. Thus the bacteriolytic serum is composed of two parts, one the result of immunization which is thermoabile and is called immune body, intermediary body or amboceptor, the other occurring in normal serum which is thermoabile and is called complement, alexin, etc. This same phenomenon is also seen in hemolysis of red blood cells and in the action of the various cytotoxins. These latter bodies are formed as the result of injecting an emulsion of red blood cells, or practically any form of cells of one species into an animal of another species. The serum of the animal thus immunized shows a specific lytic action on the type of cells employed in the immunization.

THE OPSONINS.

In the above reaction we have seen that the mode of defense on the part of the organism is brought about entirely by means of chemical substances in the serum. However, in studying the process

of immunity from the standpoint of opsonins, we find that there are two factors of importance, namely, the neutrophilic polymorponuclear leucocytes and a substance in the serum called opsonin. The opsonin acts upon the bacteria, modifying them in some way that they can be taken up by the leucocytes. The opsonic phenomenon can be observed by mixing equal portions of blood serum, bacterial emulsion and washed leucocytes. This mixture is incubated and from it slides are prepared. It will be seen that the leucocytes have taken up a fairly constant number of bacteria.

Opsonins are found in all sera, both in normal and immunized individuals, the amount of opsonins in normal persons being practically constant. Opsonic action occurs with a great number of bacteria, the more common ones being the staphylococcus albus and aureus, the streptococcus pyogenes; gonococcus, pneumococcus, the typhoid bacteria and colon-bacillus, bacillus pyocyaneous, and tubercle bacillus, and also with certain nonbacterial cells as red blood cells, blastomycetes and trypanosomes.

As to the nature of opsonins and their relations to other antibodies very little is known. In some respects they are similar to antitoxins, especially in regard to their combining properties. The opsonins are thermoabile and are found in normal sera showing a close relation to complements or alexins, while the increase in the amount of opsonins following the injection of dead bacilli shows to a certain extent their similarity to immune bodies or amboceptors. Similarities and differences can be found between opsonins and many other antibodies, but their true nature is far from being understood.

The specificity of bacterial opsonins has not been clearly determined, but for many bacteria it seems fairly well established.

The stability of opsonins varies under certain conditions. If kept at a temperature of 2 degrees C. it remains unchanged for about ten days. On standing at ordinary room temperature it loses about one-half its power in five or six days. Direct sunlight rapidly decreases the opsonic value, while heating at 60 degrees C. for a few minutes destroys it.

Certain chemicals called anti-opsonins have the power of retarding or inhibiting opsonic action. These are isotonic solutions of salts of Ba. and Mg. K_2. So_4, K Fe $(C\ N)_6$, etc., formaline, lactic acid and chloroform

As to the source of opsonins practically nothing is known, and, moreover, there is no definite relation between the amount of opsonin present and the degree of leucocytosis.

The most interesting points in regard to opsonins are that the amount in the serum of a patient suffering from an infection can be accurately compared with the amount of opsonin in the serum of a normal person, and that the total amount of opsonin can be increased by inoculation with bacterial vaccine.

As mentioned above, for each organism all normal individuals have practically the same amount of opsonin. In other words, the opsonic index is equal to one. In order to determine the relative amount of opsonin in the serum of a person suffering from a bacterial infection the following method is employed: The bacteria causing the infection is determined and an emulsion of it is prepared. Equal quantities of this are mixed with the patient's serum and washed leucocytes. Another similar mixture is made, using the serum of a normal person, the serum in these mixtures being the only variable factor. These mixtures are incubated and stained, smears are then prepared and the average number of bacteria taken up per leucocyte is determined. This constitutes the phagocytic index. The ratio between the phagocytic indices of the normal and infected person equals the opsonic index.

In practically all chronic infections the opsonic index is low. The probable explanation for this is as follows: The bacteria on gaining entrance to the tissues produce two effects. First they stimulate the formation of antibodies or opsonins, and second a local inflammatory reaction is produced. If the amount of opsonins produced is not sufficient to successfully combat the infection in the acute stage the process becomes chronic. Granulation or scar tissue forms about the focus of infection, walling off the collection of bacteria from the general blood stream. The normal opsonin of the serum and leucocytes can pass through this wall, and the former is practically exhausted in an attempt to combat the infection. But this scar tissue wall prevents the bacteria from coming in contact with the general blood stream in sufficient quantities to stimulate the required amount of opsonins. Hence the low opsonic index in chronic infections. The therapeutic value of vaccines at once suggests itself. If an emul-

sion of the same strain of bacteria causing the infection is killed by heat and injected under the skin these dead organisms will be able to come in contact with the general blood current over a large area, and thus stimulate the formation of new opsonins. Thus the amount of opsonins will be increased, and on being carried to the site of infection will be in greater quantity to combat it.

A few days following the injection of bacterial vaccines there is a sudden fall in the opsonic index. This is called the negative phase. The index then begins to rise, and we get the positive phase, which may reach from two to six times the normal. It is during this positive phase that the curative action takes place. After from seventeen to twenty-five days the index gradually drops to normal, and it is at the beginning of this drop that we have the indication that it is time for another injection of vaccine. After each injection the same train of events occurs, except that each positive phase becomes higher than the one before, and after several injections remains permanently high, "the high tide of immunity" of Wright.

The value of opsonins in acute infections is probably as great as in the chronic forms: however, very little is definitely known in regard to this. In acute infections there is no scar tissue wall about the focus of bacteria, so that the micro-organisms causing the infection can directly stimulate the formation of opsonins. In most acute infections, and especially in the acute forms of tuberculosis, the opsonic index fluctuates between positive and negative phases, due probably to the periodic stimulation of opsonin formation by the living bacteria, causing the disease. The therapeutic use of bacterial vaccines in acute infections so far has been of little value, and may even be harmful on account of an accumulation of negative phases being produced.

The diagnostic use of the opsonic index may prove of value in determining the variety of organism causing hidden infections. This will be only of relative value, however, until the specificity of opsonins is more thoroughly established. In regard to the tubercule bacilli the specific action of the opsonin seems to be proved, and this method constitutes one of the most important aids in diagnosing tuberculosis infections.

Our knowledge of opsonins is in its infancy, but in the ligh-

of what little we know it seems safe to conclude that the injection of certain bacterial vaccines under the guidance of the opsonic index offers one of the greatest therapeutic aids in the treatment of chronic infections that we have at the present time.

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PRACTICAL APPLICATION OF OPSONINS.

BY H. S. THURSTON, M. D., OF INDIANAPOLIS.

In considering the practical application of opsonins nothing will be mentioned in this paper as to their formation or supposed origin, or as to what they are, for that has already been carefully explained in that part of the subject by Dr. Reed.

Sir A. E. Wright, of London, was the first man to give us the name "opsonin," as well as the technique. A brief description of the same is deemed advisable. He took equal volumes of bacterial emulsion, washed white corpuscles and serum, mixed them thoroughly together in a pipette, sealed it in a flame and incubated the contents for fifteen to twenty minutes at 37 C. Then a drop of the mixture was smeared, fixed and stained on a slide. The enumeration of the number of bacteria in the polymorphonuclear neutrophilic leucocytes is made under an oil immersion lens and an average per leucocyte is obtained. This is called the phagocytic index. The ratio of the average to that for a normal serum, using the same emulsion of bacteria and leucocytes, constitutes the opsonic index.

In order to make the emulsion of bacteria the organism in question is grown upon agar slants or other solid media for twenty-four hours and then washed off with normal salt solution. This is allowed to settle, and it is better to centrifugalize for five or six minutes. There results an opalescent supernatant fluid which is used for the bacterial suspension. Owing to the clumping of the tubercle bacilli, a small amount of bacteria are ground up in an agate mortar. The dead organism may be used. The rest of the procedure in the preparation of the emulsion of tubercle is the same as already described.

The washed white corpuscles are obtained by receiving 10 to 40 drops of blood into 5 to 40 c. c., of a one per cent. sodium citrate in 0.85 per cent. salt solution. The sodium citrate solution prevents coagulation of the blood. The corpuscles are thrown

down with a centrifuge and are washed once in an 0.85 per cent. salt solution to remove all traces of serum and citrate solution. The white corpuscles will be lying between the red cells and supernatant clear solution of salt. This is known as the "cream."

In order to obtain the serum, small glass capsules are prepared to collect the blood. The blood is allowed to clot in them, and incubating for a few minutes accelerates the process. The capsules of blood are centrifugalized until the clear serum stands out distinct above the corpuscles. This serum contains the opsonin. The sera from a number of individuals by which a serum is compared constitutes the "pool," and is a better average than that from one person.

The smears having been made, may be stained with any ordinary blood stain, such as Jenner's Wright's or Leichmann's. For the tubercle the ordinary tubercle stain is used. Miller, of Detroit, recommends the following method for tubercle: Fix the smear in a saturated bichloride solution, wash, stain with carbolfuchsin, decolorize in a 2½ per cent. solution of sulphuric acid, wash, follow with acetic acid, wash, counterstain with alkaline methylene blue, wash and dry with blotting paper.

Simon, of Baltimore, modifies the technique of Wright by diluting this sera of control and test serum, and compares the number of leucocytes of each engaged in phagocytosis and not the number of bacteria in the individual white corpuscles. Simon calls it the percentage method.

Preparation of Bacterial Vaccine.—A culture of bacteria in question, either from bouillon or preferably from inclined agar, is emulsified with physiological salt solution. It is better to isolate the organism from the individual infected in order to procure the proper strain of bacteria. This is especially true in tuberculous infections. The count is then made of the number of bacteria per c. c. by mixing one part vaccine, one of normal blood and three of physiological salt solution thoroughly, and then making a smear of this mixture on a slide. This is stained and then the number of bacteria and of red cells in successive fields of the microscope are enumerated until at least 200 red corpuscles have been counted. As the number of red cells per c. c. is 5,000 millions, the number of bacteria per c. c. can be determined by a simple arithmetical process. If the bacterial emulsion

is very dense it is well to take one part of the emulsion and a sufficient number of parts of blood so that the number of bacteria does not differ greatly from the number of red corpuscles. The vaccine should be sterilized by heat, preserved with lysol or other antiseptic and sealed in glass tubes which contain a single dose.

In administering bacterial vaccine for therapeutic purposes, the frequency of administration and the size of the dose depend on the kind of vaccine and on the patient. As a general rule the dose should be given which gives the maximum or positive phase consistent with the negative phase. In round numbers, the doses frequently used for the various bacteria are as follows: Staphylococci, 300,000,000; pneumonococci and streptococci, 50,000,000; gonococci, 10,000,000; colon bacilli, 75,000,000 to the c. c. The dose of tuberculin is 1-5000 mg.

Diagnostic Value of the Opsonic Index.—To staphylococci, streptococci, pneumococci, gonococci, colon bacilli and tubercle in normal persons the opsonix index is fairly constant to these pathogenic organisms. It has been found that after injecting the vaccine in question into a healthy man that his opsonic index falls slightly for one or two days and returns, then rises slightly above normal for about the same time and returns to what it was previous to vaccination. In a man suffering from some infection with one of the above organisms his negative phase is longer and lower, and likewise his positive phase. In case of a tuberculous infection the negative phase may last one week or longer, which frequently occurs in too often repeated vaccination, and it may be two or three weeks before the acme of the positive phase is reached. There is usually a disappearance of the protective elements of the blood, but there is left behind a more or less permanent increase over the original. Wright speaks of the whole sequence as the "Law of ebb and flow, and reflow, and subsequent maintained high tide of immunity."

Persistent low opsonic index indicates infection or susceptibility, and it is often seen in chronic surgical tuberculosis.

Again, a fluctuating opsonic index from low to high, other things being equal, points strongly to tuberculosis, especially of the pulmonic type. It is claimed by some that an opsonic index to tubercle as low as 0.3 or as high as 1.8 is strong evidence of

tuberculosis. High opsonic index in individuals with systematic infection or one fluctuating from high to low, Wright maintains is due to repeated inoculation by bacterial products from his own focus of disease. and that it is comparable to the results obtained by artificial inoculation.

Before the administration of a vaccine the opsonic index should be taken, and should again be taken before a revaccination. If it is given while the index is low it will still go lower, and the desired object would not be attained. The constitutional symptoms guide very little, and the opsonic test is the only safe guide to dosage.

According to French, in tuberculosis the opsonic index should be taken at intervals on the third, seventh, eleventh, fourteenth and seventeenth days. If it shows no appreciable change either the patient is not tuberculous or the dose requires to be increased. About seventeen days to three weeks from the injection of vaccine the positive phase should be well marked.

During the positive phase of any infection, and while it is increasing, if there is no indication of a fall it is not necessary to revaccinate. In surgical tuberculosis the infection may be subacute or chronic; the infected area may be easily accessible to the circulating fluids or may be so circumscribed as to be practically outside of the body. As it is well seen that upon this auto-inoculation chiefly depends, the process may continue because the protective substances are not formed sufficiently and quick enough to overcome the auto-inoculation.

If the toxins which are generated are excessive, inoculation of tubercle vaccine would be contra-indicated, absolute rest would be employed to keep the circulation quiet in the infected area, and the surgeon would have to determine whether the local conditions were sufficient to warrant an operation during the negative phase or whether he could wait until the resistance of the individual was raised by other means.

On the other hand, if the infective process is not excessively active the resistance might be raised by artificial inoculation or other means could be taken to bring more blood to the diseased area. The opsonin in the circulating blood may be normal or slightly below, and the contents of a tuberculous abscess may contain none of the protective substances. It is claimed that this inert fluid has probably by mechanical pressure prevented the

flow of lymph through the abscess wall and its immediate neighborhood. With its disappearance the parts have been flushed with lymph charged with bactericidal substances. By some this is offered as an explanation for the many good results obtained in tubercular peritonitis after exploratory laparotomy.

Time will not permit to take up individual infections and discuss them at length, but I will report a few cases gathered from the literature that have been benefited by the vaccine treatment, and close by adding some cases successfully treated by myself and Dr. Reed during the late winter and spring of the present year.

Ohlmacher, of Detroit, reports a series of cases treated by vaccine that are very interesting. He had two cases of acne vulgaris of one and two years duration. In each case the staphylopsonic index was low at the beginning, and he was able to raise the index by inoculation of staphylovaccine at intervals from seven to ten days. In his first case eight injections were given, and there was almost a complete cessation of the acne process. In his second case, which was more severe, his results were practically as good as in the first case.

In a case of impetigo which he reports the staphylococcus-pyogenes aureauas and streptococcus were both isolated. He gave one dose of Staphylococcic-vaccine and the pustules were brought to a standstill. One week later he gave a dose of streptococcic vaccine with the result that the impetigo absolutely ceased.

In chronic furunculosis, axillary adenitis, palmar abscess where either the staphylococcus or streptococcus were present his results have been exceedingly good. His best success has been from autogenous vaccine.

In a case of colon bacillus infection in which there was present cystitis and pyelonephrosis his treatment with auto-inoculation has been very satisfactory. In this case there was marked constitutional disturbance, the kidney was readily palpable and a tender large mass was distinct. The opsonic index was two-thirds that of a normal individual. A preparation was made from the bacilli obtained from the urine, and artificial inoculation at intervals of five to ten days, five doses in all, increasing in size, were given. Within seven weeks' time his patient's index rose, and the constitutional disturbance was very much improved. This case was practically cured.

His cases of gonorrhoeal affections are very interesting, for they were successful as regards recovery. He treated cases consisting of balanoposthitis, double epididymitis, perineal fistula, subacute epididymitis, gonorrheal rheumatism, gonorrheal ophthalmia, conjunctivitis and vaginitis. These cases had no other form of treatment except in a case of arthritis, in which he stretched a stricture. He also combined the irrigation method with the vaccine treatment in two cases of infants suffering from vaginitis.

Dr. Hektoen, of Chicago, reports fifteen cases of various forms of tuberculosis treated with tuberculin under the guidance of the opsonic index. He claims cures in two cases and marked improvement in all other cases except one, which had not been treated long enough.

Lyon reports the use of pneumococcic vaccine in a case of pneumococcus empyema which had been running a very unsatisfactory course. Immediate improvement ensued, and it resulted in entire recovery in two weeks.

Dr. Reed and the writer have been able to equip a laboratory in the Indiana Medical College, School of Medicine of Purdue University, for opsonic work. We have been successful in making the emulsion of bacteria, obtaining the white corpuscles or cream and serum which contains the so-called opsonin. We have been successful in making opsonic indices according to both Wright's and Simon's methods and to prepare vaccines. However, we have experimented less with Simon's method.

In order to overcome one of the chief difficulties which is not mentioned in Wright's technique we have found that it is more satisfactory to standardize our emulsions of bacteria before mixing them with the serum, or opsonin, and white corpuscles. This is accomplished by mixing equal parts of blood and bacteria, smearing, staining and estimating approximately the number of bacteria in the solution. If this is not done there may be so many or so few organisms that it will be confusing in making the estimation. For this reason Simon abandoned this method and devised his own technique.

For us a satisfactory stain was difficult to make, following the stains mentioned in the literature, except the tubercle stain. We found that it was difficult to distinguish in many specimens the

heavy staining particles of protoplasm of the nuclei from bacteria. Dr. Reed found that by fixing the smear in absolute methyl alcohol for one to two minutes, staining with Toulidin blue for one minute, washing, counterstaining with saturated aqueous solution of eosin for ten seconds, then washing and blotting that a better definition of the bacteria was obtained. This has been the chief method that we have followed of late. We have two cases to report of acne in which we were able to isolate the pathogenic organism, viz., the staphlylococcus albus, and treat with vaccine made by us. The cycle of events in these cases has corresponded very much in the findings of Wright and others. In the one case, which was an affection of ten years' duration, with two injections of vaccine the lesions have disappeared, and at the same time an atrophic rhinitis has materially improved. The course of events in the cases was very much alike. The opsonic index was low in each case. The index went still lower on the second day after the injection of vaccine, then there followed a rise, and on the fifth day it was much higher than at the first taking.

We worked quite a while in comparing indices in order to perfect our technique, and we have found a fairly constant overage to the particular organism in question in normal persons. Our experience has been too limited to make any personal claim or even prophesy of what can be accomplished by the opsonic method of diagnosis and treatment. The work is fascinating, tedious but full of interest for one who has taste for such work. We are inclined to think and hope that it is in its infancy of usefulness for mankind.

Before closing we desire to thank Dr. C. S. Little for helping us in equipping our laboratory, Dr. Earl Miller, of Parks, Davis & Co., who has furnished us with many supplies, and Drs. Ritter and Ferguson for the use of their private laboratory.

OPSONIC TECHNIQUE.

BY B. W. RHAMY, M. D., FORT WAYNE, IND.

Not since the days of Koch and Pasteur has there been such an advance in bacteriologic science as at the present time. It is within the memory of living men that pathogenic bacteria were things undreamed of. As early as the seventeenth century micro-organisms were observed, but it was not until 1863 that Pasteur established their role in the etiology and pathology of disease. It was soon found that bacteria eliminated toxins, and that blood possessed protecting properties which varied at different times. Virchow noticed the ameboid movement of leucocytes and their ability to take up inert particles. Mettschnikoff in 1887 evolved the phagocytic idea, i. e., that leucocytes by chemotaxis were drawn to an infected site and took up the invading micro-organisms. Buchner in 1888 showed that blood serum contained bacteriocidal properties, and called the agents within the blood bacteriolysins.

Vaughan in 1891 concluded that immunity depended on the existence of certain proteid substances in blood serum. These proteids have been called by different observers germicidal globulins, nucleins, defensive proteids and alexins. These antibodies are supposed to be proteid substances, and destroy or neutralize bacteria and their toxins. Depending on their action, the various anti-bodies are designated antitoxins, lysins, precipitans, cytolysins and agglutinins.

In 1890 diphtheria antitoxin was introduced, followed by tetanus antitoxin, antivenine and others, which have been used with varying degrees of success. The side chain theory of Ehrlich in 1897 was given as an explanation of the action of antibodies. This theory was founded on the physiology of cell nutrition, and is that each body cell has a peculiar affinity to its individual nutrient molecules by means of imaginary appendages named receptars, which combine only with molecules possessing a like appendage termed haptophores.

Now, certain toxins may happen to possess like haptophores, as, for instance, the tetanus toxin's affinity for brain cells. When this latter combination takes place the cell may die either from starvation because the nutrient molecule is excluded or from toxin poisoning. When the toxins lack these haptophore appendages this combination does not take place, and we have a state of "natural immunity." If, however, the cell survives the attack it may be stimulated by the toxic irritation to develop new receptor appendages, which combine with and neutralize more toxin haptophores, and we have "acquired immunity." If this receptor formation becomes excessive they may become detached from the cell and circulate in the blood stream ready to combine with the proper toxins. These free receptors are supposed to be the antibodies.

In 1895 Denys found that the blood serum contained an antibody which acted on bacteria and rendered them more susceptible to phagocytic action. In 1902 Leischman began estimating phagocytic power by mixing equal parts of blood and a watery emulsion of bacteria, incubating and counting the average number of organisms per leucocyte in a stained slide of this mixture. In 1903 Wright and Douglas noticed that when a patient was inoculated with a small dose of a sterilized emulsion of bacteria this phagocytic power was increased. They named the antibodies responsible for this action opsonins, and devised a method, which is a modification of Leischman's, to estimate the opsonic power or index.

In making the opsonic determination four things are necessary:

First, a culture of the bacteria in question.

Second, a quantity of washed leucocytes.

Third, the patient's blood serum.

Fourth, normal blood serum.

The method is as follows:

THE EMULSION FROM THE BACTERIAL CULTURE.

A pure culture is obtained directly from the patient. An emulsion is made by washing off the bacterial growth with a little normal salt solution (85 per cent.), using a platinum loop if necessary to detach the growth. This is shaken thoroughly to break up clumps and centrifuged for one minute. The upper

stratum of fluid is designated as "bacterial emulsion." As a general rule it is well to have fairly thick emulsions, there being more liability to error in thin emulsions. In making the tubercle emulsion the dried tubercle bacilli are used, and must be ground in an agate mortar for an hour or so to break up the coils. The tubercle emulsion can be kept permanently, sterilizing it after use. In the case of other organisms a fresh twenty-four hour culture should be used each time.

WASHED LEUCOCYTES.

The washed leucocytes are prepared by dropping from ten to forty gtts. of human or other mammalian blood into ten or fifteen c. c. of one per cent. solution sodium citrate in 85 per cent. solution, and shaking thoroughly to prevent clotting. Centrifuge for five minutes and draw off the supernatent fluid with a curly pipette. Mix with normal salt solution to remove the trace of citrate, again centrifuge for five minutes and draw off the salt solution. The leucocytes are abundant in the upper stratum of the sediment and are designated "washed leucocytes." On account of contamination they can only be kept a few hours.

THE PATIENT'S SERUM.

The patient's serum is obtained by pricking the end of the finger with a needle and collecting in a small glass capsule of suitable design. The ends of the capsule are sealed in a flame, after which it is taken to the laboratory. In collecting the blood it is recommended that the finger be congested by winding with tape, and preferably punctured at the base of the nail, using for convenience the drawn out end of the glass capsule for a needle. My own experience has been that the blood is easier obtained and flows more freely if the finger is not wrapped, allowing the free circulation to keep the finger full of blood. Almost any amount can then be gently squeezed from the puncture, which for this method is made in the end. The capsules are centrifuged for five minutes or longer, either before or after clotting, in order to separate a clear layer of serum. If the clotting is marked it is sometimes not necessary to centrifuge. This serum should be used within twenty-four hours, since the opsonic power gradually weakens until in three days it is practically gone.

THE NORMAL SERUM OR POOL.

The normal serum is obtained in the same manner as the patient's serum, from one or more normal individuals, the number depending on the organism to be tested. The tubercle bacillus, for instance, needs but one normal serum, while for the staphlococcus or colon bacillus the variation in individuals is so frequent that it is essential to get an average mixture of sera from several individuals.

METHOD.

Equal parts are then taken of the bacterial emulsion, washed leucocytes and blood serum, and intimately mixed. This is done with a capillary pipette on which is marked with a blue pencil a convenient measure of volume. A volume of washed leucocytes is drawn up in the pipette, then a space of air is allowed to enter, then a volume of bacterial emulsion, another space of air and finally a volume of the patient's serum. They are then forced out on a clean slide and thoroughly mixed by drawing in and out of the pipette. The mixture is then drawn up to about the middle of the capillary tube of the pipette and the open end sealed in a flame. A like mixture is prepared in another capillary pipette, using the normal serum instead of the patient's. The two pipettes are labeled and placed in an incubator at 37 degrees C. for fifteen minutes. They are then removed, the sealed end broken and again thoroughly mixed on a clean slide.

Thin films are then made by drawing the rough filed edge of another slide across the surface of the slide holding the drop. Good smears can be obtained in this way. The grinding of the smooth surface of the slide recommended by some workers being laborious and superfluous. The films are allowed to dry in the air and fixed either with methyl-alcohol or heat. Wright recommended Leischman's solution of polychrome methylene blue as the routine stain, but the writer has found that a simple stain either of Loeffler's methylene blue or carbol-thionin gives a deeper stain and is a much simpler staining method.

In staining films of tubercle bacilli the writer uses heated carbol Fuchsin, followed by Gabbot's solution of methylene blue in 25 per cent. solution of sulphuric acid. If necessary the nuclear stain of the leucocytes can be reinforced by using Loeffler's

methylene blue after the acid methylene blue. The stained film is then placed under the oil immersion lens, and the bacteria in at least fifty polynuclear leucocytes are counted in each slide and the average number of bacteria per leucocyte calculated for each slide. Then taking the average of the normal slide as the standard and arbitrarily calling it one, or normal, we compare the average of the patient's to it.

For example, suppose the patient's average be five bacteria per leucocyte and the normal average ten per leucocyte. Then the patient's opsonic index would be in the proportion 10:5::1:5, or .50.

It might be well to repeat that only polynuclear leucocytes, and at least fifty are counted, although in a number of comparisons we often found but slight variation in columns of twenty-five cells each. The practical value of this method is to regulate the size and frequency of the injections of the sterile bacterial emulsions which Wright used to stimulate the opsonic power. These sterile emulsions were called "vaccines" by Wright, and for that reason, as well as for brevity, this name should be retained.

The vaccines are prepared by growing a thick culture from the patient's infection. This is mixed by means of a platinum loop with a small quantity of normal salt solution, poured into a test tube and agitated thoroughly to break up clumps. The strength of this emulsion is found by mixing equal volumes of emulsion and blood together and diluting with three volumes of salt solution. A smear is made from this mixture and stained with carbol thionin or other suitable stain. The average number of bacteria and red cells respectively are counted in twenty fields, using a diaphragm in the eye piece to contract the field. The calculation is made by taking the proportion: The bacteria in an average field : to the red cells in an average field :: the bacteria in a unit of volume : the red cells in a unit of volume, using the normal 5,000,000 red cells per C. M. as a unit of volume. Multiplying this result by 1,000 we get the number of bacteria per c. c. of emulsion. The tube containing the emulsion is then sealed, placed in a vessel of water and then placed in an incubator at 60 degrees C. for one or two hours, or just sufficient to render it sterile. Culture tubes are inoculated to be sure sterilization is

complete. The vaccine of standard strength is made by diluting this emulsion with ¼ per cent. solution of lysol in normal salt solution poured into sterile dark glass bottles, sealed and labeled. It is the writer's custom to make all stock vaccines of the same standard strength, i. e., one c. c. containing 1,000 million bacteria. From this the weak vaccine can be made to any strength desired by dilution. It will be seen that vaccine therapy follows out Ehrlich's theory of acquired immunity by stimulating the formation of opsonic antibodies with small doses of toxic material, and thus by increasing the natural resistance enable the patient to throw off infection.

That vaccine therapy does bring about immunity has been established beyond question, and it only remains for investigation to show what infections and under what pathologic conditions it can be applied. The organisms found thus far to respond to opsonic stimulatoin are the tubercle bacillus, colon bacillus, typhoid bacillus, bacillus proteus, bacillus pestis, shiga bacillus, anthrax, cholera vibrio, gonococcus, micrococcus, melitensis, staphlococcus, streptococcus, pneumococcus and the micrococcus neoformans. In our work no attempt was made to select cases, but every infection available was taken without regard to the pathologic condition. The organisms employed were tubercle bacilli, the colon group, staphlococcus, streptococcus, pneumococcus, bacillus proteus and micrococcus neoformans.

In regard to this last organism a pure culture was first obtained from the discharge of a recurrent uterine carcinoma of a coccus of sparing growth, which showed some chain formation. The report was made that it appeared to be a peculiar form of streptococcus. A similar culture was obtained from a facial epithelioma. Later we found Wright's description of micrococcus neoformans in Progressive Medicine, March, 1907, in which he states that it grows sparingly on agar, that it occurs in short chains which often bifuricate, and shows a different opsonic index when compared with staphlococci or streptococci. Another culture was obtained from the epithelioma, and this as well as the former smears were studied and found to answer his description. Autogenous vaccines were made for each patient with the exception of the tubercular infections, in which new tuberculin was used. It will probably be found that other stock vaccines can be

used for different individuals, but for the present it is essential that the vaccines be made direct from the patient's infection.

In conclusion the writer would urge that where double infections exist they be treated simultaneously, since healing is not so apt to take place so long as either infection persists.

A REPORT OF TWELVE CASES OF BACTERIAL INFECTION TREATED BY VACCINE THERAPY ACCORDING TO WRIGHT'S METHOD.

BY BEN PERLEY WEAVER, B. S., M. D., OF FORT WAYNE.

The series herein reported to you was undertaken with the desire of gaining by practical application a more intimate knowledge of what would seem at present a most promising auxiliary to medicine and surgery, and it is with the hope that this small series may lend some aid in determining the therapeutic rank due such agent that the following results are presented.

Case I—C. M. Dr. Gilpin. Adult male. Greek. Admitted January 22, 1907. Diagnosis—Double lobar pneumococcus pneumonia, complicated by bilateral pleurisy with effusion. History of about two weeks' illness previous to admission. Temperature on admission 99.4° F., pulse 114, resp. 36. Temperature at 6 p. m. 103.6° F., pulse 122, resp. 36. Up until his discharge March 17, 1907, aspiration of the pleural cavities was employed in all five times, with total withdrawal of something over 74 ounces of fluid. Temperature ran an irregular curve up until February 21, varying from 97° F. to 103° F., with pulse varying from 90 to 140. Sputum culture showing pneumococcus of Fraenkel, the opsonic index was determined first February 18, 1907, and found to be 0.89, and he was accordingly inoculated first February 20 with 20,000,000 pneumococci. Subsequently and up to the time of departure from the hospital he was inoculated at intervals, in all five times, the only appreciable result being that from an irregular and indefinite course his temperature curve assumed a more typical morning recession and afternoon rise. At the time of discharge his morning temperature was 96° F. and 4 p. m. temperature 102° F., with corresponding pulse fluctuation. So that it would seem fair to conclude that we had here to deal with a combined pneumococcic and tubercular infection, although we were unable to isolate the tubercle bacilli from the sputum; nor was a tuberculin test resorted to, the latter princi-

pally because of the irregularity of the process, the daily fluctuation of temperature being so marked as to preclude a satisfactory tuberculin test. As will be seen at a glance at the accompanying curve, his index to the pneumococcus two days previous to discharge was above normal, i. e., 123. An index determination to the tubercle bacillus would have been interesting in that it would perhaps have shed some light upon the above drawn conclusion.

Case II—R. J. Admitted February 21, 1907. Drs. McKeeman and Porter. Male, colored, aet. 10. Tubercular hip joint disease, with secondary infection with staphylococcus albus. Present trouble began with discharge from left hip last winter (one year previous to admission). In all three sinuses formed, discharging three or four days, then closing. Sweats considerably at night, has lost quite a little weight, coughed some. February 21 a large abscess on upper outer surface of left thigh was opened, with the evacuation of a large amount of very offensive pus. February 22, 1907, smear from pus of wound showed tubercle bacilli. February 23, 1907, index to tubercle bacillus stood at 0.72. Operation February 26, 1907. Three sinuses about hip were opened up and considerable pus evacuated from an opening on inner femoral aspect. A glance at the curve shows the effect of the operation in setting up an autoinoculation. Unfortunately for our purposes, we experienced considerable difficulty in the beginning in obtaining the tuberculin R, and were forced to use an old product which was probably inert, as was the tuberculin O used a little later in this case. Acting upon the suggestion of Wright, Webb and others that in tubercular processes with complicating secondary infection the best results were often obtained by first attempting to control the complicating factors, a culture from the dressing was made April 4, 1907, and showed the staphylococcus, to which the patient's index on April 8, 1907, was 0.79. A vaccine was accordingly prepared from this organism and inoculations of 10,000,000 given on the 11th and 18th, with a corresponding rise in the index. The staphylococcic infection being fairly well controlled, the injections of TR were begun again April 22d and continued until the discharge of the patient May 14th with an index to the tubercle bacillus of 1.73 and 1.38 to the staphylococcus. All sinuses had healed, there had been a marked gain in weight; in fact, the patient looked and seemed well in every respect save for the deformity.

Case III—A. D. Dr. Porter. Tubercular osteo-myelitis of the tibia. Male, aet. 56. Admitted February 5, 1907. Present trouble manifested itself about one month previous to admission to hospital, with pain and soreness in middle of shaft of tibia, tender on pressure; considerable loss in weight. February 6, 1907, incision was made over middle third of tibial shaft, medullary canal opened up, curetted out thoroughly throughout middle third. Contents of canal on microscopical examination showed tubercle bacilli. Canal was swabbed out with iodine solution, rubber tube drain inserted and wound closed up to drain. Union by first intention up to drain, but subsequent findings indicated an extension of the process into upper third, and accordingly on February 28, 1907, the canal was again opened up and its upper third thoroughly cleaned out and swabbed with iodine, drainage being kept up for about two weeks. Upon removal of drain would healed promptly and has remained closed to date. The first index determination, made three days after the operation (see curve 3), shows again the autoinoculative effect of operation upon these lesions. In the early part of our vaccine treatment of this case we were likewise handicapped by our inability to secure a fresh preparation of the tuberculin R, although the curve might indicate that at least some effect was gotten from the older preparation used, while the subsequent employment of three doses of T O availed nothing so far as raising the curve is concerned. Later, however, we were able to obtain the T R, and his condition May 17 is as follows: Patient has just returned from a pleasure trip to Chicago, feeling first rate and weighing two pounds more than he has ever weighed in his life. His curve likewise shows a satisfactory rise. His full weight can be borne on the leg with little or no discomfort.

Case IV—Miss H. Adult. Aet. about 20. Simple acne which had followed a severe anemia at twelve years, but became more persistent and obstinate the past one and a half years. Culture from indurated comedo proving to be staphylococcus albus, vaccine treatment was begun, and in all six inoculations given, with a gradual but progressive improvement in the condition of the face. Patient says that whereas formerly the eruption persisted in the form of slowly healing red blotches, the lesions now readily dry up in small, hard particles, which can be easily rolled out and leave no

induration, as well as being much less profuse in number. Although acne at best yields stubbornly to the treatment, yet we have been still further handicapped in this case by the irregularity of the visits, the patient being a nurse and away from the city most of the time.

Case V--G. R. Drs. Rhamy and Barnett. Male. Aet. 19. Genito-urinary tuberculosis, with secondary infection of the bladder by the bacillus proteus. First came under observation December 17, 1905, complaining of soreness in bladder region; there were also a loss of ten pounds in weight, afternoon rise in temperature and malaise. Hemoglobin 100 per cent., leucocytes 20,000. Urine showed albumin 1.1 per cent. by volume, no casts, but pus and tubercle bacilli. The therapeutic administration of old tuberculin was begun with one-half m.g. doses three times a week, increasing gradually until in June twenty m.g. doses were being given. Although advised to continue injections for some months, patient ceased treatment because he felt well. Urine examination July 9, 1906, showed no albumin, trace of pus and no tubercle bacilli. November 30, 1906, patient returned with a recurrence of all the old symptoms in a more aggravated degree. Urine showed albumin one-half per cent., pus five per cent. by volume, tubercle and proteus bacilli. Patient was losing weight rapidly. January 19, 1907, opsonic therapy was instituted, using the old tuberculin in initial doses of one five-hundredth m. g. and a vaccine made from the bacillus proteus obtained by culture from his urine, the initial dose being 30,000,000 bacilli. A glance at curves 5 A and B will show that we have succeeded in raising the indices to both organisms to a considerable degree, and the clinical picture has been one of a corresponding progressive improvement, with the patient gaining in weight and, to use his own expression, "feeling all right." An examination of the urine May 15th showed a faint trace of albumin, pus one per cent., no tubercle bacilli and practically no proteus organisms, a few streptococci, however, being isolated.

Case VI—Mrs. L. Dr. McKeeman. Puerperal septicemia. Placenta previa, with hemorrhage at seventh month and again for two days previous to entrance into hospital February 23, 1907. Delivered of dead baby at 6:30 p. m. February 23, 1907. Temperature normal, pulse 160. Temperature 12 a. m. February 25,

1907, 102° F., with chilly sensation. From this time on her temperature and pulse continued to intermit with almost daily chills, the temperature at one time going as high as 105.4° F. and pulse 160. Being invited to institute the vaccine treatment, a culture from the cervi was taken, which showed a slow growing streptococcus, to which on March 15th the patient showed an index of 0.57, and inoculations were begun the next day, starting with 2,000,000 organisms. Although during the remainder of her stay in the hospital the patient had in all five inoculations, the last two being 10,000,000 each, we were never able to raise her index above 1.02 (on March 27th, see curve 6), and on April 8th she was taken from the hospital by relatives, the last index (April 5th) being 0.78. It was subsequently learned that death occurred two days after departure from hospital. Despite the commonly accepted belief that general infections do not yield so markedly to the vaccine treatment as do localized ones, and notwithstanding the intense anemia that we had to combat in this case, yet the conclusion is forced upon us that had we persisted in the minimum doses used in the beginning of the inoculations, following Wright's advice of oft-repeated small inoculations in generalized infections, we would at least have been giving this woman the best possible fighting chance for her life.

Case VII—W. H. Dr. Weaver. Squamous-celled epithelioma of the face and neck. Present trouble dates back about three years, when hard lump of increasing size, together with neighboring glands, was removed from under and slightly anterior to the angle of the left jaw. Recurrence took place about edge of wound, with secondary operation one year after. Recurrence again taking place, resort was had to the paste, followed by caustic. The wound thus made persisting, the use of the X-ray was begun June, 1906, and continued until in all about sixty exposures had been made, the only apparent effect being to check somewhat the advance of the process. The growth having, however, involved the inside of the mouth, the actual cautery was used both externally and inside the mouth. A salivary fistula being formed and particles of bones being occasionally discharged, the combined use of the X-ray and injections of trypsin and amylopsin was resorted to, with a cosniderable initial improvement, It being only temporary, however, and a discharging nodule hav-

ing formed on the posterior surface of the opening, a culture was made which bore some resemblance to the streptococcus, but on more careful study of a second culture was found to correspond to the micrococcus neoformans as described in the case reported from Wright's clinic (see "Progressive Medicine," March, 1907, p. 251). A vaccine from this organism was accordingly prepared and inoculations begun March 20, 1907. Curve 7 shows beautifully the index variation characteristic of bacterial infection, so that we feel warranted in concluding that this case is one more instance in support of the belief that infection by the micrococcus neoformans is at least one of the factors which must be reckoned with in connection with malignant diseases. Clinically there has been in this case considerable cicatrization about the edges of the growth, the open wound is becoming smaller and the edges present a cleaner, granulating surface, the patient has a fairly good appetite, sleeps well and is not losing in weight, so that on the whole we feel at the present time that he is perhaps holding his own.

Case VIII—Mrs. E. Dr. Porter. Admitted February 2, 1907. Right pyelonephritis (probably tubercular), with secondary infection by the bacillus coli communis. Aet. 25, no children. Present trouble dates back eight or ten years, with symptoms of bladder irritation. Pain in right kidney and ureter, and pus in urine for over two years. Is having irregular chills and fever. Anorexia, nausea and considerable loss in weight. February 12, 1907, right nephrotomy, with evacuation of considerable pus from two abscesses in kidney substance, gauze drainage. Following operation she had but one chill, but temperature continued more or less irregular, and on March 29th a typical reaction followed the injection of a diagnostic dose of old tuberculin. The bladder symptoms continuing, a catheterized specimen of the urine was taken, which on culture yielded a growth of the colon bacillus, to which her index on April 8th was 0.94 (see curve 8 A). A vaccine from this organism was given for the purpose of bringing up her index for this infection, which was accomplished, and in order to have further proof that a tubercular infection is also present her index to the tubercle bacillus was determined on April 18th and 20th, and the characteristic fluctuation occurring in such infections found. At the present time the index to both

infections is rising in a satisfactory manner, with a simultaneous clinical improvement. The colon bacilli in the urine are greatly diminished in number, and many of those present are phagocyting. The pain and frequency of micturition are decreasing to such an extent that we hope to have the bladder infection controlled by the time the kidney wound is entirely healed.

Case IX—Mrs. S. Dr. Porter. Admitted April 1, 1907. Married six years. Sterile. Abscess of kidney (probably tubercular). Present trouble dates back two and a half years. For past ten weeks has had chills and sweats. Confined to bed four weeks previous to admission. First noticed tumor in kidney region two weeks before coming under observation. Has had local pain intermittently ever since beginning of trouble (two and a half years). April 2, 1907, left nephrotomy with evacuation of considerable rather thick, cheesy pus, from which microscopically and culturally no organisms could be isolated. Although the patient has had no chills since operation, yet her temperature continues to fluctuate daily, the variation between morning and evening temperatures being from two to four degrees. For this reason a diagnostic tuberculin injection could not well be given, and resort was had to an index determination for the tubercle bacillus, which showed 0.62 on April 8th. (See curve 9.) Accordingly, inoculations of T R were begun, and in all four were made up until the patient left the hospital, May 26th. Although the index was not yet at a satisfactory level, the patient seemed to feel so much clinical improvement that she insisted on returning to her home, to return for inoculations as needed. Inasmuch as she has not yet returned, our observations in this case, unfortunately, are inconclusive save for the progressive improvement taking place in the short time the patient was under observation.

Case X—Mrs. T. Dr. Dancer. Colon bacillus endometritis. Aet. 28. Three children and three abortions. History of profuse uterine hemorrhages dating back to September 21, 1906. Periods irregular in frequency and duration, patient at one time being confined to bed one week. Anemic, lost five pounds in weight. In November, 1906, bimanual examination revealed large, boggy uterus, retroverted and fixed; cervix eroded and red. Profuse leucorrhea, necessitating the constant wearing of a pad; constipation. Cervical culture made December 15, 1906, showed colon

bacillus, to which the index on December 20 was 0.35. January 23, 1907, patient had been in bed for eight days with profuse menorrhagia, followed by anorexia and insomnia. Inoculation was begun January 30, 1907, with twelve and a half million colon bacilli (see curve 10). From this time on to the present there has been a steady rise in the index, and a corresponding clinical improvement. The February period was much more comfortable, the March and April ones almost normal. Whereas originally the leucorrhea discharge was profuse and of a decidedly foul odor, it has now become very scant in amount, with a very slight odor. Cervix clear. Patient eats well, sleeps well and says she feels better than she has for eight years. No other treatment.

Case XI—E. H. R. Dr. Porter. Aet. 64. Sacculated bladder with 16 oz. of residual urine. Suprapubic cystotomy and tube drainage for two weeks. Catheterized specimen of urine showing bacillus proteus. The index for that organism was determined April 15th and found to be 0.92. Although patient had but two inoculations before leaving the hospital, his index was 1.32 with a clinical improvement in temperature, pulse and condition of urine. A subsequent report from his physician states that despite two more inoculations he has not improved much more, and his index on May 13, 1907, was 0.99. A still later report from his physician, May 19th, informs us that the patient is better within the past few days, and that he believes the old gentleman will recover. Small inoculations are now being kept up by the physician in attendance.

Case XII—Mr. R. Aet. about 60. Infection of frontal sinus necessitating operation and drainage. The discharge persisting unduly, a culture was taken, which proved to be the streptococcus pyogenes, to which the patient's index April 26th was 0.94 (see curve 12). After the first two inoculations the index went up to 1.42, but within the next week dropped considerably, and at the same time patient gave symptoms of a possible extension of the process. The inoculations have been continued, however, four in all having been made so far. At the present time he is more comfortable than a week ago, and we are hoping that with the continued use of drainage and the vaccine we may be able to raise the index again and overcome the infection. As yet the results are inconclusive in this case, although the curve has risen

satisfactorily within the past forty-eight hours and discharge has lessened.

From our observations so far conducted it would seem fair to conclude that:

1. A study of the opsonic indices in cases of bacterial infection offers itself as both a ready and accurate agent in diagnosis.

2. The same study applied in its relation to artificial inoculation affords a safe and apparently reliable check on a rational therapy.

3. The clinical results so far obtained are sufficiently encouraging to warrant a most careful study of this method and its applicability to all cases of bacterial infection, and particularly those in which a culture is readily available.

Finally, we wish to acknowledge our indebtedness to those physicians who have so kindly lent us their assistance in undertaking these observations.

DISCUSSION.

Dr. C. S. Bond—I think we are to be congratulated on having these papers read, more especially as they include original work. We all have access to more or less of the literature, and it is our duty to become familiar with it; so that original work in this line becomes of importance. Americans are given to kicking. They are not ready to accept, ordinarily, the things put before them as readily as Europeans. It may be that for this reason we are just now on the point of giving our first kick.

I just recently had a very valuable opportunity at the meeting of the Association of American Physicians in Washington to hear a symposium on this subject. This symposium included six papers on the opsonic index and opsonins by very celebrated men in this country. Dr. Hektoen, of Chicago, through Dr. Herrick, had a paper in which he reported fifteen or sixteen cases of tuberculosis—that have already been spoken of—in which favorable results were shown. He also reported favorably in other diseases. Results in the hands of others were not so favorable. In fact, Dr. Hektoen, of all the papers read at Washington, gave the most favorable view of the opsonic treatment. We had there papers from such men as Dr. Opie, Dr. Baldwin, Dr. Schorer of New York, Drs. Baker and Cole of Baltimore, Drs. Biggs, Park and

Potter of New York, besides a general discussion before the association. The consensus of opinion outside of Dr. Hektoen was that we should be very careful about this work; that it was in its infancy; that it was not shortening the course of diseases to any appreciable extent, and that the opsonic index was not reliable. Now, when we think of the underlying factors we have in these diseases we must know that we are dealing with a very complex subject. In the first place, we do not know anything about what opsonins are, as has been acknowledged by everybody who has written on the subject. The chances are that they are very highly organized bodies and capable of a great many cleavages. Dr. Vaughan of Ann Arbor had a paper at this association on egg white in which he showed the effects on animals of injections of its split products; several of these products having been differentiated by him. One nonpoisonous product in the first injection became poisonous after five to eight days and the rabbit was killed after second injection by changes taking place in the animal during the interval. So that in our enthusiasm in this matter we should be very careful about injecting compounds into the body that we know very little about.

All doctors who have been practicing medicine for some time can recall the enthusiasm that has gone over this country by waves, beginning with the use of carbon dioxide gas in the colon in tuberculosis, and the promotion of adhesions in the chest cavity by bandages, the tuberculin tests, lauded for a long time, and we have come back to almost the same point we started from. I am not a pessimist and don't want to be understood in that light, but I think unless we make careful, repeated experiments along these lines we should not come to any too definite conclusions at this time.

Dr. C. F. Neu: This question of opsonins is one that we all know is engaging not only the scientific medical world but the practical as well. It is not a new principle; it is a new term applied to an old principle, started long ago, as indicated by one of the writers, by Jenner when he instituted the process of vaccination in smallpox. It has been further carried out by Koch in his tuberculin theory, and in connection with the other antitoxic products, such as that for diphtheria, and has later been

put upon a scientific basis and applied by Wright and Douglas. As has been indicated, the constitution of these opsonins is unknown. They are closely allied to, and probably at basis the same principle underlies their construction as in the other alkaloids as studied by Kitasato, Behring, Koch and others. From the results obtained we can not deny that it is of importance and significance, both from a diagnostic and a therapeutic standpoint, but we have to accept the results with caution. Every new theory has an immense number of enthusiasts, and we hear a great deal of the results that are accomplished. Many of them are more anticipated than real and we must accept results with caution. And while this is true, we have to admit that its application is of benefit but its field of use is limited. There are a great number of factors that limit its usefulness. The machinery and detail of their manipulation is so complicated and intricate that it can be of use only in the hands of experts, and that of itself puts it beyond the ordinary practitioner. Where experience may and can be had to put it in application it is certainly well worthy of use and appliance. As has been indicated, it opens up an immense field for new investigation and has an important bearing on the subject of immunity. In this connection it is of importance to ascertain whether the organism in the pathological process produces bodies to counteract the vitality of the tissues—a condition of lowered immunity—or whether it is the lowered vitality of the tissues themselves. The source of these bodies or opsonins must undoubtedly come from cellular activity, but whether it is a secretion or not we do not know. It is something produced by the protoplasm—produced by a reaction of certain materials in the body, but whether it is produced by bacterial action or by toxins from disturbed metabolism is a question to be determined.

The President: We have the pleasure of having with us this morning Dr. Webb of Colorado Springs. He has recently returned from Wright's laboratory in London. We should be pleased to hear from Dr. Webb.

Dr. Webb: Mr. President, Ladies and Gentlemen—I have not just returned from London. I returned last year. I worked with Wright three months in his laboratory and have since been work-

ing at my home town in Colorado Springs. I first want to correct an impression one of your men has given as regards the meeting of the American Physicians in Washington week before last. I was there and was invited to take part in the discussions. The question there was more the opsonic index rather than the vaccine therapy, and I think it is most important to get these two facts differentiated in our minds. The opsonic index was the chief point of the discussion, and these men, all of whom I know well, in their laboratories, were more condemning the index as an accurate estimate. They are quite right. Wright does not claim that it is accurate. He claims there is an error of ten to twenty per cent., and in what clinical test is there not error? You can take it several times, and then your error is largely eliminated.

I will briefly tell you about the work I have been doing this winter, because I think vaccine therapy is especially interesting, and our failures are interesting. My chief failures were in staphylococcus acne of the face. Out of five cases I cured three; but could not get a prolonged immunity. In seven cases of boils they were all cured, but they came back with a new crop and I cured them again and they are well today. I have been working in cases of tuberculosis and have seen very good results. But I want you to understand that in these cases of tubercle you must use the vaccine from a mixed infection. Wright repeatedly pointed this out to me in all the cutaneous and glandular lesions. In pulmonary tuberculosis I have been working on many cases, some in the second and third stages, by means of mixed vaccines, and have reduced the expectoration from six ounces a day to one-half ounce a day. I have also done work in staphylococcus and pneumococcus infections of the ear and nose. In one case a man, following an attack of influenza, had a pneumococcus infection of the ear. His opsonic index was .7. He was cured by one inoculation of fifty million of his infection, and in a few days was well. Another case, an infant at the breast, had a double otitis media due to staphylococcus and pneumococcus infection. I gave it two months to improve under an ear specialist but without improvement. I made a vaccine from the germs and inoculated the mother, and the result was that by transferring the immunity through the mother's milk the discharge from one

ear stopped following the first dose and in the other ear the pus was reduced to one-half or more following the second dose. I do not doubt that the infection will get well by inoculating the mother.

I think I can give you a case which is a most important test of this work, and really the opsonic index was not necessary to be found. One of the most incurable things we have in medicine is typhoid infection of the ribs. We can take the rib out and it can not be cured. It will spread. I had a case of a rather prominent man who had three or four ribs infected with typhoid, and the sternum and costal cartilages. He had had four or five operations and was soaking thick dressings once or twice a day. The staphylococcus and typhoid germs were found. The opsonic indices were below normal. I made vaccines and inoculated him. There was no change whatever after the first two or three doses, but following the fourth dose there was a diminution of the discharge, and following the tenth or twelfth doses that man was absolutely well. I followed the opsonic index. It is not necessary in a great many cases. This man's serum at the start would not agglutinate typhoid bacilli. At the end of ten days it would spontaneously agglutinate the typhoid bacillus.

I would refer to one or two remarks of the papers as to the neoformans in cancer. Wright has practically given it up in cancer. He has come to the conclusion that it is only a variation of the staphylococcus, and by following the staphylococcus through different agars one can get the same effect as with the neoformans.

I don't want you to go away with the idea that it is a panacea. You are going to meet with disappointments. There are people that won't react. The patient has no resistance, no machinery that you can call into action. So far from what I have seen you do not get a prolonged immunity. One has to keep on using these vaccines.

Dr. Manwaring, of Bloomington: I simply wish to emphasize one or two points Dr. Webb has made. I am very glad he has pointed out that we are dealing here, not with one problem but with two problems; and that the two problems are distinct, one from the other. The first is the problem of the opsonic index

as a method of diagnosis. The second is the problem of bacterial injections as a means of cure.

On the first problem I wish to say that we have been engaged, during the last year, in the pathological laboratory of the State University at Bloomington in research in phagacytosis, and that the opinion gained from this experience coincides with the opinions presented at the recent medical congress held in Washington, D. C.

We have found the opsonic index, as determined by an improved Wright's method, unreliable. This unreliability is due solely to the large experimental error in such measurements. For instance, ten duplicate determinations, made in our laboratory, showed a possible error in such work of 35 per cent. Similar duplicates, made elsewhere, show for example apparent variations in the opsonic index from 0.5 normal to 1.7 normal, due solely to crude experimental method.

Opsonic determinations vary so much for this reason that curves determined by a skilled worker, showing the apparent daily variations in opsonic power in normal and diseased individuals, cross and recross in such a way as to be absolutely indistinguishable one from the other.

The best test thus far made of the reliability of opsonic determinations is probably that of Dr. North, of the College of Physicians and Surgeons, of New York City. Dr. North submitted approximately a thousand samples of normal and diseased blood to a dozen of the best known laboratories of the United States for opsonic determinations. A sample of their reported results will be sufficient. Thus, one laboratory, receiving ten duplicate samples of normal blood, reported opsonic indices varying from 0.8 normal to 2.15 normal. Taking the average of all his reported indices as the correct index, Dr. North found that the minimum error made by any laboratory in these determinations was 25 per cent., that the maximum error was over 300 per cent., and the average error 50 per cent.

That means that if the real index in a given sample is 0.8 normal, determinations may show an index as low as 0.4 or as high as 1.2, due solely to experimental error. Opsonic determinations, then, at least in the hands of American investigators, are too crude to be relied upon for diagnostic purposes. Such

determinations have, for this reason, been discontinued in many of our most prominent eastern hospitals.

What does this mean as to the future of vaccine therapy? It means simply this: That, until a reliable technique is devised, the physician must depend entirely upon the clinical picture in judging as to the advisability or non-advisability of instituting bacterial injections, in judging as to the desired size and frequency of the bacterial dose, and in judging the results by vaccine treatment.

Dr. Webb: I desire to correct some of the impressions that have been given here. I know these gentlemen who have worked on these different laboratory tests, and all now condemn the work and are sorry it was published. I do not condemn the opsonic test. In proper hands it is very reliable and should not offer more than ten per cent. of error, and it is of use in diagnosis; but as to these reports from Washington, I talked to all the men concerned, and the trouble was it was carried on at different times. Blood loses its opsonic index in a short time—in ten to thirty-six hours. Not only that, but at Johns-Hopkins laboratory the blood arrived there contaminated with other organisms, and so it happened at Saranac, so that we can not go by that as conclusive evidence and thus condemn the persons who absolutely condemn the results themselves, and say the medical profession should not go by them.

Dr. Manwaring: I wish to say in connection with these tests that the comparisons were not all comparisons made by different men. The comparison I gave you was of ten samples received in the same package by the same laboratory, of the same blood, examined by the same man, by the same technique, in the same forenoon.

Dr. M. F. Porter: As a man engaged for some years in practical work, and my natural tendency being to be weaned away from day to day from the laboratory work, I want to say something as to my estimation of this opsonic work. I am not competent to speak of the details of the work, but I have been a very close observer, and I have had quite a good deal of this work done in connection with my own operative work at home, and my firm conviction is that there is much in opsonic therapy. One bird

does not make a summer, to be sure, but when we take the number of cases that have been reported, the cures and the number of cases that have been benefited, it seems to me that the burden of evidence if you wish to overthrow this therapy is upon the other fellow. Some of these cases reported by Dr. Weaver, for instance, these discharging sinuses of the hip: Why, gentlemen, those of us who have been in surgery for a few years know what almost all of these cases do after we have done our best, relying solely upon the means that, until Wright's theory was promulgated, we knew of, and now we know at least what a great many of them do by the help of our laboratory brethren, and it does not make much difference whether we know what it is or not. We don't know anything about electricity. We would like to know, all right, but the fellow who is sick wants to get well, and he don't care whether he is getting well by serum treatment or not.

Now, regarding the danger, I do not think there is a great deal of danger. I do not think there is as much danger in this treatment as Dr. Bond would seem to indicate. Ordinarily the serum is manufactured from the fellow himself and you are not going to hurt him very much by giving it back to him again.

I think there is good reason for suspicion, at least, that we have at last found an explanation as to why it is that opening a man's belly in tubercular peritonitis cures him. I believe it is to be found in this opsonic theory. Now, in the observations had in reactions following operations and the difference made by operations in the opsonic index I think we have smething here that explains in part why the patient gets well of tubercular peritonitis after being laparotomized. I do not think we are in any danger of going wild over this matter. I think the profession owes a great deal to our young enthusiasts, and our peripatetic pessimists can keep us close enough to the ground so that when we fall we won't get hurt much.

Dr. C. S. Bond: I really laid too broad a foundation for a five-minute talk, and therefore could get very little superstructure erected. I have been attacked from two or three different standpoints, and I am glad my good friends preceding me have carried my opinions out. I did not mean to make any deductions from our work at Washington. I had opportunity to speak only

of one or two phases of this large subject, and left it in bad shape to be followed by Dr. Webb, but I can say that not only the opsonic index was under discussion but more especially were opsonins discussed. I had conversations with the men at the semi-centennial at Philadelphia, and these men told me they had not obtained great results from their work from a therapeutic standpoint, while the consensus of opinion was that it had not proven to be the success they had hoped for; not that I intended to say there was nothing in it. I compliment this work, and it is to be complimented. Anything in medicine is to be complimented where research work is done. I think this work ought to be carried on. I only want to say it may be carried out in a way to be harmful. I did not mean to say that these things were always toxic in the blood. You might kill a man by his own products if placed again into other parts of his body. You might kill him by egg white if administered untimely and improperly. Dr. Porter's suggestion, therefore, does not have to do with the argument. I only wanted to bring out in my talk, while reviewing this matter, as was done in Washington, that we ought to be careful about our enthusiasm.

Dr. B. W. Rhamy: I thank the members of the society for their comment, favorable and otherwise. We must remember that this theory and practice is in its infancy, and the reports that are coming in are the early reports, and as I have said in my paper, it remains to be seen how much of practical value there is in the vaccine therapy. I have always been rather conservative about new theories, but when Wright's theory came out his reports seemed so favorable I concluded to take it up and see what I could find in it. As Wright himself says: "The reasoning man will not wait, like the pessimist, to be shown, but he will take up the work and find out for himself, for the pessimist, who waits to be shown, is usually willing to wait forever." I am glad, for one thing, to have heard Dr. Webb. I have read some of his work and the intelligent manner in which he presented it made me very glad to hear him.

In regard to the danger of these injections, cultures are made from them first to see that they are sterile, and the opsonic index tells us how big a dose it is safe to give him. An illustration of

that is in one of the cases we reported just taken under observation, an infection of the frontal sinus with streptococcus. The first injection we gave was a small dose. The index promptly rose and the discharge got very much smaller, the man got an appetite and began to feel good. Following that he had some trouble with an old tooth, and the oculist removed some diseased bone from the nose. The opsonic index began to drop, he began to feel badly and the discharge increased again. I gave him a larger dose; he got worse and the index had gone still further down, so I concluded from the clinical symptoms and from the opsonic index that I had given him too large a dose. I then gave another small dose as I had in the beginning, and the index immediately shot up above the normal, the discharge began to cease and he began to feel good. Now, I think that case was a simple demonstration of the importance of the opsonic index.

In regard to the reliability of the index, of course there is some error, first on account of the lack of skill of the man doing the work, and secondly, the same liability to error which accompanies almost any clinical observation. I have made so far something like 150 indices, and it struck me from these observations that it was remarkable how accurate it was. If there was no similarity or accuracy at all it would be plain in this many experiments. I am myself firmly convinced there is something in this theory and that it will be of much practical importance.

Dr. B. P. Weaver: One of the most beautiful things in regard to Wright's work is his modesty and conservatism, if the reports are reliable. In London they are in the habit of trying the various methods of curing chronic troubles, and after they fail they send them to Wright and he cures them up in a few weeks or months and don't make very much fuss about it either.

As to the therapy proposition, particularly in tuberculosis, it strikes me that when a man as conservative as Trudeau of the Saranac Sanitarium sanctions it and gets an increase in his cures of 20 per cent. there must be something in it. He is not a man that takes to whims. Whether or not it is exact in every detail, it would seem that there is a rationalism about it that ought to appeal to us. Find out what the infection is and then undertake the means to cure it. If we have a means that can be proven to be exact, let us take hold of it and use it. If we all take hold

of it and find that it is not a rational method, then throw it over. This can be done only by prolonged work, and the more we are encouraged the more we will want to do it.

We are particularly fortunate in having Dr. Webb with us. His article in Colorado Medicine for January was perhaps the most impressive and most interesting of the series that I have had the opportunity of reading. Whether you are interested in the work or not, you will be interested in that article.

If ten specimens of blood were sent a distance that would require, say, twenty-four or thirty-six hours in transportation, with chances of their contamination and decrease in the opsonic index, and we know that the power of the blood to react disappears altogether within three days, perhaps, and then these ten specimens were examined by one man in one forenoon—I would say it takes two of us all day working as hard as we can to make five determinations—then I wish to say these determinations ought to be questioned.

Dr. J. V. Reed: In regard to the diagnostic value of the index, I think every one working with it will feel that it is only relative value. There are a great many factors entering into it. The personal equation must be taken into consideration. Nevertheless, it is of great importance in the diagnosis, even though it is only relative. There is some question in my mind of the value of the index after vaccination has been done. In injecting bacteria we get bacteriolysins formed and they may destroy the bacterial emulsion we are using, so that after giving an injection our opsonic index will be low when we have even a high immunity. This should be worked out to a greater extent before we can depend on the opsonic index following vaccinations. We have gotten our error within ten per cent., and a variation of fifty per cent. would seem to require a brushing up in the technique.

INTRACRANIAL LESIONS OF OTITIC ORIGIN.

BY JOHN J. KYLE, M. D., INDIANAPOLIS.

It may be taken as a truism that a discharging ear, either acute or chronic, is a dangerous ear. Also that an acute fulminating otitis media purulenta is more dangerous than a chronic purulent otitis media. Considering the great number of cases of acute purulent inflammation of the middle ear that recover completely without any complications, it would seem that my truism is not a truism at all; however, the proof that I shall offer will convince all of the truthfulness of the statement that a discharging ear is a dangerous ear.

The avenue of extension of infection to the brain from the middle ear may be metastasis or direct extension by continuity of tissue, through the roof of the tympanic cavity, the mastoid antrum, the mastoid cells, the internal ear, the internal auditory canal, as reported by Pierce and Toynbee, the acquaductus Fallopii, the carotid canal, the foramina for nutrient vessels to the middle ear, communicating veins with the jugular fossa, the foramen for the auricular branch of the vagus nerve and the fissure of Glasier, which contains the tympanic branch of the internal maxillary artery, by the vascular interspaces between the unossified and the ununited osseous portions of the temporal bone, especially in infants, and by the small venulas traversing the mastoid region.

Among the intracranial lesions which may originate from the ear and its adnexia, are tumors, insanity, cholesteatomata, acute or chronic cerebral or cerebellar abscesses, leptomeningitis, pachymeningitis, basilar meningitis, serous meningitis, meningism, as described by Chevalier Jackson, epidural abscess, sigmoid sinus thrombosis, jugular and sinus thrombosis, sinus phlebitis, cavernous sinus thrombosis, brain tumors, local cerebral softening, caseous degeneration, gangrene, thrombosis of the cerebral sinuses, ulceration of the brain and primary bulb thrombosis. The last condition, however, is one open to question.

It is difficult to secure accurate statistics in regard to the frequency of brain complication in acute or chronic ear disease; however, in a review of twelve thousand seven hundred forty-four cases of suppurative ear disease treated at the Manhattan Eye and Ear Hospital, Harris found that sixty cases suffered from meningitis, twenty-three from sinus thrombosis, and seven from abscess, six of which were located in the temporal lobe, and one in the cerebellum. In my own practice during the past two years, five cases of sinus thrombosis have been observed, one abscess of the brain and two cases of meningitis. My five cases of sinus thrombosis all followed an acute otitis media purulenta, three of which died and two recovered. It is from this experience that I feel justified in making the statement in the beginning of this paper that either an acute or chronic discharging ear is a dangerous ear.

The prognosis of intracranial complications depends primarily upon early operative measures, and secondarily upon the thoroughness of the operation. There always comes the question in the treatment of acute mastoiditis as to the indications for abortive treatment and the time that should elapse before resorting to surgical measures. There is no fixed rule that can be applied to the abortion of acute inflammation of the mastoid; the success of the treatment is dependent upon the general vitality of the individual and opsonic index of the isolated organism producing the disease of the individual. If the opsonic index is low, the disease will probably resist any abortive treatment, and if high and treatment is scientifically applied, the disease may be blocked in its destructive process. Rest in bed, free purgation, a diet of predigested beef or liquid peptonoids, and dry heat continuously to the mastoid will, if it is possible, establish a local healthy metabolism more speedily than by any other method. If, after forty-eight to fifty-two hours, there is no remission of the swelling and temperature, operative measures are indicated. The danger of a mastoid operation, as an operation per se, is much less than the uncertainty of the future of a mastoid suppuration at any stage of the disease.

The character of the infection varies, and may be mono-bacterial or poly-bacterial, and may spring from a suppurating ear or from a non-suppurating ear. Infection may spread to the

meninges from a non-suppurating ear as well as from a non-suppurating frontal or ethmoid sinus. As long as there is an existing foci of infection near the brain, under favorable conditions, an extension to the brain can be expected. It is often very difficult to explain the avenue of infection in the many forms of meningitis; it is reasonable, however, to expect infection to be carried more rapidly where the vascular interspaces are the greatest and in the closest relationship, and it is therefore probably true that it is through the nose or ear that infection is most frequently carried to the brain.

The organisms most frequently found in brain disease of otitic origin are streptococcus pyogenes aureus, staphylococcus pyogenes aureus, tubercle bacillus, Eberth's typhoid bacillus, Klebs-Löffler bacillus, the bacillus diplococcus intercellularis of meningitis, and the pneumococcus.

I desire to call attention to the danger of removal of a polypi from the ear in an old suppurating wound, on account of the not infrequent connection of such growths with the cranium, and also to the danger of applying escarotics or forcing strong fluids into the ear for the relief of suppuration. Where there is a formation of polypi, there is usually a necrosis of bone, and if the polypi spring from the attic of the ear, there is always the possibility of an erosion exposing the dura. We should also remember in treating a suppurating ear that possibly a chronic brain abscess may be draining into the ear. Such conditions have been observed by Hoffman, Albers, Macewen and others.

Macewen observed a case in which the surgeon flushed the ear with a solution of nitrate of silver, forcing the fluid into the cranial cavity, producing death.

In the treatment of suppurating ears, free drainage and cleanliness without resorting to force, should be a ruling principle.

In a consideration of insanity from otitic origin it would be interesting to have the statistics from some of our great hospitals, especially our Central Hospital for the Insane. However, I know that in many cases of chronic suppuration of the ear, with slumbering mastoid inflammation, having constant or periodical headache, absorption of morbid products and a general lowering of the physical and mental tone sufficient to excite the alarm of observing parent or physician, these symptoms may progress, and

if not relieved by operation, may end in insanity or some suppurative brain disease.

The following case will portray such a condition and show what we may sometimes find in individuals with a suppurating ear, where symptoms are too frequently attributed to indigestion, eye strain or some imaginary disorder.

Case I—Chronic discharge from the left ear for eight years; no odor to slight discharge which was detected glazing the inner tympanic wall.

BLOOD EXAMINATION BY DR. W. T. DODDS.

Red cells	4,536,000
White cells	10,000
Polymorphonuclear variety	8,800
Mononuclear variety	600
Lymphocytes	400
Transitionals	200
Hemoglobin	393
Color index	102

Microscopical examination of pus from middle ear: Large cuboidal epithelial cells. many pus and mucous corpuscles; staphylococcus in abundance and a diplococcus intercellularis meningitidis, the latter being in the pus cells.

Urine: Two per cent. urea, excess of chlorides, uric acid and urates.

The above examination, with subjective symptoms, showed necrosis in flat bone and general absorption, with a disposition to cerebral complication. Meningitis serosa is but a short step from meningeal irritation due to middle ear suppuration. The serous meningitis of Quincke in complication with acute otitis media or accompanying or following a mastoidectomy, is an especially interesting condition, first because of the alarming symptoms, and second because of the favorable outcome, many times, of the disease. Serous meningitis of Quincke is suddenly, during the otherwise seemingly satisfactory course of the disease, ushered in with a high temperature, rapid pulse, delirium and symptoms of pressure in the posterior fossa. There may be present optic neuritis and strabismus.

I have already referred to the meningitis of Quincke, and shall, on account of the time at my disposal, only refer to two cerebral

complications, meningitis and sinus thrombosis, for the reason that they are the most frequently observed and of more interest, leaving the other complications to some future paper.

Meningitis may take on so many variations that it is quite impossible to classify accurate differential symptoms, or prognosticate the condition. Not infrequently symptoms point to positive brain complications, only to show no lesion whatsoever at the post mortem table, as shown by Whiteneck. (Journal of Laryngology, June, 1906.)

Meningitis may imply pachymeningitis or leptomeningitis; however, the latter lesion is implied in a discussion of meningitis. Meningitis may be purulent or serous; on account of the varied degree of the latter lesion encountered originating in the ear, it is really of more prognostic interest than the cerebral or cerebellar abscess. The differentiation everyone admits to be frequently difficult.

Meningitis due to the pneumococcus runs a much more rapid course (five to six days) than that due to infection from the diplococcus of Weichselbaum or the tubercle bacilli, which may run a long course, varying from a week to two or three months. In favorable cases, however, the improvement usually begins after the first week.

Cerebrospinal meningitis is presumed to be due to the diplococcus intercellularis alone.

Meningitis may be due to single or double infection, which may be caused by the diplococcus of meningitis, the staphylococcus or streptococcus pyogenes aureaus, the pneumococcus, typhoid bacillus, bacillus tuberculosis, gonococcus, as observed by Trow as a cause of mastoiditis (Canadian Pract. and Review, 1903), the Klebs Löffler bacillus, the streptococcus of erysipelas, the grippe bacillus and unknown bacteria. The tubercle bacillus or the diplococcus intercelluaris meningitidis of Weichselbaum may multiply and remain within a suppurating ear, causing a condition of slumbering mastoiditis, which for years produces a slight irritation of the meninges, only awaiting an attack of influenza, pneumonia, typhoid fever or some disease sufficient to lower the resisting power of the meninges to bring about this severe complication.

In one case observed by the author, one week after simple

mastoidectomy following acute otitis media purulenta, there was delirium for two weeks, with a temperature varying from 100 to 105°. In this case no operative measures were resorted to and the patient made a perfect recovery. Cerebral symptoms of pressure were present, though not profound. There was present high temperature, delirium, and a rapid pulse, though no optic neutitis. A condition of this character was evidently metastatic and due to the organism producing the mastoiditis, the streptococcus pyogenes aureus, or its toxins. The blood examination showed a high leucocytosis, with abundance of polymorphonuclear leucocytes. In this case a purulent discharge persisted from the mastoid wound for two months, completely disappearing with perfect healing of the wound.

According to Quincke, any opening made into the arachnoid space will be followed by a cure.

Ballance, in a discussion of a paper by Dench on treatment of intracranial complications of middle ear suppuration, read at the section on Laryngology and Otology of the A. M. A., June, 1906, said there is a rise of temperature, slowing of the pulse, vomiting, dizziness, stability of the pupils and some redness of the optic disk, and that the condition can be relieved at once by lumbar puncture. Dench (ibid) said: "I am inclined to believe that the best plan of treatment is to relieve the pressure by lumbar puncture, and, failing in this, to relieve the increased pressure by craniectomy, followed by an incision of the dura and of the cerebral substance." He also said he believed it better, provided the ventricular distension is not sufficient for free drainage after brain substance has been penetrated for the distance of an inch, to simply incise the brain substance.

In addition to the symptoms enumerated by Ballance, the general symptoms of meningitis are headache, delirium, muscular twitching of the arms and legs, grinding of the teeth, involuntary discharge of urine and the feces, contraction of the muscles of the neck, relaxation of the muscles of the abdomen, causing the classical, so-called boat-shaped abdomen, contraction of the pupils, injected conjunctiva, hyperesthesia of the muscles of the neck and calves of the legs, and sometimes general cutaneous hyperesthesia.

In very young children epileptoform convulsions and opisthotonos may be the first symptoms of the disease, with now and then

a peculiar "hydrocephalic" cry. The temperature may vary from 100 to 106°, and the pulse from fifty to one hundred twenty per minute, with a tendency to drop to the lower figure.

Kernig's sign is usually present, i. e., an inability of the patient while lying on his back to flex the thigh without at the same time flexing the leg, and also the inability to completely extend the leg.

Trousseau's sign may also be present as shown by the contraction of the muscles of the upper extremities, following pressure upon the tendon of the biceps.

According to Körner, motor aphasia is more frequent in meningitis, and is due to a severe exudation into the sylvian fissure.

In enumerating the eye symptoms observed in meningitis, I can do no better than report the compilation on the subject by Robert B. Preble, Progressive Medicine, Vol. VIII, No. 1.

"Heine reports a study of the eye disturbance in epidemic meningitis, based upon a study of one hundred cases. Disturbance may appear in the motor apparatus, the sensory tracts or the nutrient portion of the eye. One should not include here the cases of conjunctivitis, keratitis and the like, which sometimes develop in the course of this, as in other severe infections, when the patients lie unconscious with half open eyes for a long time.

Hemorrhages into the retina are seen very much less often than simple intraocular optic neuritis. This is more often due to a descending neuritis from the basal meningitis. Sometimes there is a neuritis of the optic nerves behind the bulbs and without ophthalmoscopical findings, unless optic atrophy results. The frequency of secondary optic atrophy is not yet determined for want of sufficient statistics.

Metastatic ophthalmia is seen and is usually severe.

Involvment of the motor oculi nerves also occurs. They are almost always basilar in origin, more often unilateral than bilateral, and oftenest the abducens paralysis. Not rarely one sees a more or less complete paralysis of all the eye muscles. Ptosis is strikingly often absent. The milder cases often recover completely.

Of the one hundred cases examined by Heine, twenty showed eye symptoms which totaled thirty in number. There were nine cases of unilateral or bilateral optic neuritis or retinitis, thirteen with motor oculi paralysis and five with opthalmia."

Blood examination in meningitis shows a high leucocytosis, varying from 40,000 to 47,000 (Emerson), and, according to Preble, there is no material difference in the counts shown by the cases ending fatally and those which recovered.

Lumbar puncture in meningitis serosa or purulenta is a proper procedure for two reasons: first, a relief of the pressure in the sub-arachnoid space and ventricles, and, second, as a diagnostic measure. The fluid, as described by Schottmüller, may be perfectly clear in meningitis, ranging from that to a cloudy or purulent fluid. The cocci vary in number, the number having no relationship to the color of the cerebrospinal fluids. In brain abscess the cerebrospinal fluid is clear and free from cocci.

According to Lenhartz, the amount of fluid to be withdrawn should be from twenty-five to forty c. c. at each sitting, and should be performed daily. The question of early opening of the brain cavity for the evacuation of pus in this form of meningitis is recommended especially by Friedrich of Kiel. He recommends, if possible, craniectomy at the site of infection, combined with laminectomy, thus establishing drainage of the dural sac. (See Operative Treatment of Purulent Meningitis, by Prof. V. Hinsberg, Archives of Otology, October, 1906.)

It would be interesting and valuable to know the statistics of those insane from suppurative ear disease. Not infrequently acute and chronic insanity is noted following operation upon the mastoid. Family history probably plays a very important part in the etiology of insanity. In a patient tainted with insanity and suffering from a chronic suppuration of the ear or from the immediate mastoid operation, acute insanity may manifest itself at any time. In the case just reported, previous to the operation grave symptoms pointed to the possibility of insanity.

Sinus thrombosis may involve the lateral, sigmoid or jugular bulb. All three divisions may be involved at the same time, or the inflammation may confine itself to the one structure, beginning at the torcula and extending the entire length of the jugular vein of the affected side. Other sinuses may become involved secondarily from metastasis.

In diseases of the jugular vein and sinus thrombosis there may be present metastatic infiltration in the lung, liver, kidney and heart.

Early in the disease there is usually a general malaise and

sometimes slight jaundice, followed in twenty-four to forty-eight hours by rigors, which increase in number and severity and are followed by profuse sweating. The temperature is very high, differing thus from meningitis, ranging from 100 to 106° F. The pulse is exceedingly rapid, and as the infection increases, becomes weak and thready. There is rapid emaciation and toward the fatal termination of the disease involuntary voidance of urine and feces. Abscess of the lung or liver accompanying the disease, may rupture, causing the sudden death of the individual.

Early in the disease there is pain in the region of the thrombus upon pressure or percussion. Pain in the temple and forehead may be present. Though this symptom may be entirely absent, we not infrequently have tenderness upon pressure, and swelling of the tissue over the mastoid and muscles of the neck. The important symptoms differentiating sinus thrombosis are chills, followed by profuse sweating, and high temperature. The intellect is clear during the early stage of the disease and before profound pyemia is established. According to Voss, there is also present enlargement of the spleen and many symptoms that might suggest severe malarial infection. The disease usually terminates in death in from ten to twenty days. Blood examination shows a high percentage of polynorphonuclear leucocytes.

The lung complications may be the symptons which first bring the physician into the case, and not infrequently the otologist does not see the case until the sinus is completely thrombosed and a localized or diffused suppuration has been established.

Leucocytic count shows a high degree of leucocytosis, varying from 10,000 to 40,000. This condition might also be expected in acute abscess of the mastoid process; however, a high leucocytosis is indicative of greater extension of suppuration than in the mastoid alone. "The blood may show streptococcic or other infectious organisms."

A leucocytosis of 10,000 or more, following a few hours or days after operation and sustained for any length of time, is indicative, according to Emerson, of deeper complications.

The treatment of the disease varies somewhat according to the extent of the lesion. My observation is that sinus thrombosis is more often fatal when the necrosis has extended into the petrous portion of the temporal bone. With a deep necrosis in this region other complications are more likely to occur.

At present the question of most importance is, shall the jugular vein be ligated in all cases of sinus thrombosis?

Whiting (Archives of Otology, page 253, June, 1906) considers that the inability to re-establish the circulation from the bulb is a positive indication of resection of the jugular, whether the clot contained at the bulb has undergone purulent disintegration or not; also that the jugular should be resected in every instance when the clot in the sinus has undergone purulent disintegration.

John D. Richards (Archives of Otology, June, 1906, page 378) says that primary jugular ligation or resection is rarely indicated except in the presence of metastasis.

Kennon (Archives of Otology, June, 1906) says should a thrombus be situated either primarily or secondarily in the bulb we should at once expose and resect the jugular vein.

Dench (Journal A. M. A., October, 1906) says: "Sinus thrombosis, recognized early, will be almost certainly cured." Dench further says (ibid): "In a case where the general condition of the patient is good, jugular exsection should be performed at the first operation if full hemorrhage does not take place from the bulbar end of the sinus."

Before resorting to the complete exsection of the jugular vein it is well to consider first whether or not we have any metastatic complications, as pneumonia, abscess in the lung or septic endocarditis. With such complications, severe in character, there can be no good derived from a primary resection of the jugular vein. Even in a consideration of primary jugular exsection there is the constant possibility of infection, embolic substance passing through the collateral circulation of the neck. In the present light I should prefer to explore the sigmoid sinus, and with the thorough establishment of circulation plug the wound; finding the bulbar region involved with a retarded flow of blood and the patient strong and with no symptoms of metastasis, especially in the lung, would recommend jugular resection, resecting the vein as completely as possible.

DISCUSSION.

Dr. Gardner presented a clinic in opening the discussion of the paper.

Dr. Gardner: I desire to present to you a patient quite interesting from the fact that he shows the result of abscess in the

temporo-sphenoidal lobe, one of the earliest successful operations done in the state. His symptoms were those which we would expect from otitis lasting twenty years, and he had a typical mastoiditis on which I did an operation. Seven days later I was compelled to trephine for a condition showing itself in subnormal temperature and pulse, paragraphia and paraphasia and word blindness. Strange to say, though the trouble was in the temporo-sphenoidal lobe, there was no word deafness. He is now a healthy young man, strong, able to earn his living at the painter's trade and perfectly normal in every way. I think it would be impossible for any one to determine without the most severe tests any further abnormality than the trephine openings in the skull.

Dr. L. F. Page: This paper shows that great progress has been made in otology in the last ten or fifteen years. We see that the domain of surgery is being encroached upon by the otologist. I believe you will all agree with me it is just as well so. The otologist and rhinologist have done brilliant work in the sinuses connected with the ear and the nose. Instruments have been discovered within the last few years for exploring the cavities that certainly do credit to the men who are working in this field. Cases of meningitis of otitic origin that used to be hopeless a few years ago are now being operated upon successfully, and there are very few specialists of large experience who have not operated on from one to ten of these cases. Every one has had experience, and to their credit a great many cures, so that now we expect, especially in lateral sinus thrombosis, cures where it is recognized early, and if it is not recognized early it is overlooked until it is too late, until metastatic abscesses are already advanced in other organs of the body. I have operated on two cases within the last year of sinus thrombosis diagnosed as malaria, and I had a great contention to establish the fact that it was lateral sinus thrombosis, the temperature running to 105 or 106 and dropping to subnormal. In one case we had no suppuration in the ear at all. We opened the mastoid and found an involvement of the mastoid cells. I opened the sinus and found a large thrombosis. I think all who are working in this field will bear me out that lateral sinus trouble may give no symptoms at all. We do the operation on the mastoid and find the sinus in-

volved. The pus has broken through the cell walls and is bathing the sinus walls. I had a case a short time ago in which we did the mastoid operation. There were no sinus symptoms at all. The necrotic process had extended along the sinus wall, and while I was turning around to pick up an instrument the sinus wall broke through, and I had a serious hemorrhage from the sinus. The wall was rotten and broke down.

The means of diagnosis are growing all the time. The examination of the discharges from the ear is a valuable means of making a diagnosis. When you have a discharge from the ear and you find the streptococcus and the diplococcus of pneumonia present you may look for more serious trouble than where the less virulent micro-organisms are present. And we hope for further means of increasing our diagnostic powers from the opsonic tests, and I have no doubt it will show an improvement in the diagnosis of these cases.

As Dr. Kyle stated, the means of invasion are very numerous. The middle ear, the frontal sinus, the antrum of Highmore and the ethmoidal and sphenoidal sinuses are in such close relation to the brain that when these cavities are suppurating we should always look for brain involvement.

Dr. Albert E. Bulson, jr., Fort Wayne, Ind.: This subject is an exceedingly interesting one, and it should receive more consideration than will probably be given it. It does not speak well for the scientific interest of the members of this society when such a good paper as that by Dr. Kyle is read before such a small number of men who could profit by hearing it.

A fact brought out in the paper which should be impressed upon the general practitioner, and layman as well, is that a discharging ear is first, last and all the time a dangerous thing. As Dr. Roosa in his text book well says, "every person suffering from a discharging ear has a charge of dynamite in his head which may go off at any minute." This may be construed as meaning that every "running ear" is liable to be complicated by extension of the infection, with the development of one or more of the intracranial affections, to which Dr. Kyle has called our attention.

In my experience sinus thrombosis is not a particularly rare intracranial involvement. I think I have seen it about as often

as I have seen brain abscess, but not as often as epideral abscess or localized meningitis. The so-called "steeple-temperature chart," showing sudden elevation of temperature, with a corresponding drop in the course of a few hours, followed by subsequent rises and drops in the temperature, is essentially pathognomonic of involvement of the sinus when occurring in connection with suppurative disease of the middle ear. A sudden rise of temperature, either with or without a preceding or subsequent chill, occurring in the course of a middle ear suppuration, indicates an extension of the infection and propriety of operative interference. Not infrequently in such cases it will be found that the infection has gained access to the brain cavity through the tegmen tympani or the lateral sinus by way of the mastoid. These cases have the best chance for recovery when operated early, and if under competent observation the necessity for operation will be promptly recognized in the majority of instances.

I believe that we are going to hear more about the success of opsonic therapy in connection with operation in these cases. Opsonic therapy, as Wright has pointed out, is not going to lessen the necessity for operation, but it is going to materially assist in bringing about satisfactory results. Some of Wright's most notable successes have been in connection with intracranial operations where drainage was established, but the diseased process had not been entirely removed as a result of the operative interference.

I agree with the essayist in the statement that it is somewhat dangerous to remove polypi from the ear for the reason that it opens up new avenues of infection. Polypi spring from necrotic areas, and I have generally considered a patient suffering from aural polypi as a fit subject for a radical mastoid operation. A patient suffering from a chronic discharging ear which does not improve under appropriate and persistent local treatment extending over a period of two or three months is also a fit subject for a radical operation. The possibilities of intracranial involvement in the course of an ear suppuration have been recognized by the life insurance companies, and a few companies reject applications from persons suffering from a middle ear discharge.

THE TREATMENT OF INFLUENZA.

BY SAMUEL E. EARP, A. M., M. D., OF INDIANAPOLIS.

When a disease is acutely infectious and generally epidemic, prophylactic measures are in order, and the application should be made in all cases of influenza, but just to what extent may be difficult to determine. When a sneeze or a cough from an influenza patient in a theater will probably infect fifty people it is reasonable to assume that it would be better for such a person to have remained at home, or at least it would be better not to attend any public gathering. Isolation is proper so far as it goes, but there is a difficulty in drawing the line between influenza nostra and epidemic influenza vera, and yet I doubt very much whether or not it is customary to instruct a patient for the public good; quite likely indeed advice of this character is given too infrequently, and then when it is believed to be in the interest of the patient only. Sputum and secretion from the throat and nose should be burned, and clothes so saturated given the same treatment. If soiled linen for any reason is to be preserved then use a disinfectant solution of bichloride of mercury, the patient confined to the house and not mingling with the other members of the household. Strict prophlylactic measures should be inaugurated, and yet it seems strange that at least patients so infected are not advised to stay away from halls and churches or where there is a crowd indoors. Now this is mild prophylaxis, not a hardship to any one and is common sense; its adoption will do much good. We frequently observe every member of a family affected by this disease while it might just as well have been confined to one member except for the carelessness of some one. If preventive medicine is important, and we know it is, then why not let it apply to this disease whose complications often prove to be of a serious nature; if not death, it at least results in a loss to those depending upon their daily toil for bread.

Self-prophylaxis during an epidemic, or in fact at any other time, should be followed by avoiding alcoholic stimulants and

keeping the resisting power of the individual as near the standard as possible. As a prophylactic measure the Michigan State Journal for March, 1907, quotes from the London Practitioner the opinion of Sir William Broadbent, which also refers in brief to treatment.

As a prophylactic measure during the prevalence of an epidemic he orders two grains of quinine daily. The results obtained seem to justify its use, although it does not act as an absolute prophylactic. Broadbent mentions some interesting examples occurring among large groups of persons apparently all equally exposed, in which those taking the quinine escaped the disease, while the others were attacked.

He recommends quinine on the first invasion of influenza. He says he usually prescribes one drachm of ammoniate quinine and two drachms of liquor ammoniate acetatis every hour for three hours and then every four hours. In fulminating attacks accompanied by coma he gives quinine hydrobromate in large doses, and in this way has relieved the unconsciousness.

Some patients recover by rest in bed only, but they are very few indeed. Drugs are used by the majority even if not upon the advice of a physician. The pain in the head and body can frequently be relieved by acetanilid or some of its compounds. Some prefer phenacetin. It is well to let sulphate of cinchonidia or salicylate of cinchonidia enter into the combination. Some form of opium may be necessary to relieve pain or produce comfort. Codeine and heroin are good, neither constipate to a great degree and the latter is a splendid respiratory sedative, and if the cough is persistent the elixir of terpin hydrate and heroin in a dose of one to one and one-half teaspoonfuls may be used. Many times there is an uncertainty in regard to an incipient pneumonia; if so, treat it as such, and the aromatic spirits of ammonia and digitalis is worthy of consideration.

Salol, aspirin, salicine, quinine and Dovers powder, benzoate of sodium, Hoffman's anodyne are frequently used. We should not be forgetful of the fact that a thorough evacuation of the bowels at the outset is important—use calomel.

As to routine treatment which can be used in the average case in its early stage we should bear in mind that salicylate of sodium will assist in the relief of pain and shorten the duration of the disease. Bromide of sodium will allay the nervous symptoms and

overcome insomnia, while small doses of heroin or codeine will be valuable adjuvants and also assist in relieving cough. Sometimes at the onset calomel followed by a laxative is advisable. I have often used the following:

Rx.

Heroin hydrochloride	.12
Sodium bromide	8.
Sodium salicylate	8
Simple elixir q. s. ad	90.

M. S One teaspoonful three to six hours.

Instead of heroin six grains of codeine may be used in the combination, and if we desire to act with especial kindness toward the stomach, liquid pepsin may be used as a vehicle. While fever is usually of short duration and this treatment is appropriate, balneotherapeutics may be considered. Occasionally pain is intermittent; there are periods of rest and it returns with a severity that is almost unbearable. This variety of pain is not present in all cases and needs prompt attention. I have found the icebag applied to the occiput very successful, also giving large doses of bromide of potassium and a combination of cannabis indica, morphia sulphate and salicylate of sodium.

For relief and prophylaxis the throat and nasal passage must receive attention. We may use Dobell's solution, solution of bichloride of mercury or peroxide of hydrogen. Babcock suggested formalin vapor or creosoted steam. I have used a solution of boric acid and menthol as a spray. I do not like cocaine. May use resorcin, menthol and oil of vaseline on pledgets of cotton in nostrils, or eucalyptol and menthol.

With an atomizer we may use a combination of hydrate of chloral, thymol, menthol and oil of vaseline. A very simple method is the inhalation of steam which contains compound tincture of benzoin and menthol. In several cases I have noticed a bulging of the large muscles of the neck or face as if these were making an effort to mimic a myoma. These continued for several days with more discomfort than pain. In such cases I have used:

Rx.

Oil of wintergreen	8.
Spt. turpentine	30.
Oil vaseline	90.

M. S. Use as a liniment.

Complications perhaps should not come within the province of this paper; suffice to say, treat them as if they had appeared in any simple disease. Possibly exhaustion is not a complication but is usually present, and sometimes to a great degree. When we recognize that the appetite in all cases is at low ebb it is not strange that exhaustion follows, and hence nutritious diet should be insisted upon throughout the disease, and we may be able to prevent this condition and that of melancholy, which seldom fails to be present during convalescence. The person who can tickle the palate is a connoiseur, and hence a good doctor, who may also ward off the breakers in the form of complications. In prostration milk and whisky are indicated by mouth or rectum. This is the only condition unless it be a weak heart that calls for alcohol in any form, and if given otherwise it is a detriment unless the patient is an alcoholic. Strychnia sulphate, spartine and digitalin may be required or perhaps some other cardiac stimulants. I must not omit to call attention to the fact that latent diseases are aroused into activity by influenza; no better example can be given than tuberculosis. A disease that may be slumbering is likely to awaken in its fury, so if we know that the patient has a chronic disease, no matter how mild, let the treatment include it also.

However, there are typical cases which are peculiar indeed. Before suggesting treatment I will detail a description of one reported in the Medical Record of March 23, 1907 (British Medical Journal, March 2, 1907).

It commenced with sudden unconsciousness and excessive dyspnea. The patient, W. Harris, was a man of thirty-eight years, plasterer, admitted to hospital, who had fallen unconscious while at his work and had slight convulsions. He recovered in about twenty minutes, so to speak, and came to the hospital in a cab. He presented a moderate fever, slow pulse, legs were somewhat stiff, while respirations were very frequent—about sixty per minute. He also complained of severe frontal headache and of pain in his back in the lumbar region, and he was able to tell us that he had had two similar attacks, one four years and the other fifteen years previously. Examinations of the chest showed him to be perspiring freely; both sides of the chest moved well, but on percussion the note over the whole of the right front was

distinctly high pitched, and there were numerous sticky rales to be heard over the right upper lobe. The arteries were somewhat thick-walled and hard, but the urine was of good specific gravity and contained no albumin. The optic discs and retinae were normal, and examination of the nervous system showed no abnormal physical signs. Tentative diagnoses were epilepsy, cerebral tumor, hemorrhage, or thrombosis, uremia and pneumonia. The author details the reasons which led him to reject all these and come to the conclusion that the man had influenza, attaching great value to the slow pulse (56) with a temperature of 99.6. Looking at the case from this point of view, the other symptoms —the frontal headache and lumbar pain, pyrexia, sticky rales and cough—all clearly pointed to this disease. Only the curious mode of onset, sudden unconsciousness, remained to be explained, but being familiar with the literature of the disease, particularly of the epidemic of the early nineties, the author was aware of several cases having been recorded which started suddenly in this way. The aftercourse of his case proved this diagnosis to be correct. In such cases hypodermic injections of atropia and strychnia would be indicated at the outset, counter irritants to cervical and lumbar regions. Pain relieved by heroin and acetanilid compound, and this would probably allay the cough, otherwise the treatment would not differ from a typical case of influenza.

We recognize that influenza in children, which generally occurs from two to five years, necessitates a slight variance in treatment. For instance, the frontal sinus may be more highly inflamed, and the middle ear is very frequently involved. For the latter a solution of boric acid, menthol and glycerine is indicated, and atropia may be added if there be pain. Such conditions should be watched closely, so that if necessary we may resort to surgical interference. The cervical, submaxillary and parotid glands are frequently involved. Hot applications may be used, but not constantly. The best topical application is iodide of lead, ichthyol, lanoline and vaseline in combination. If these enlargements are due to the condition of the mucous membrane of the nose and throat these regions need energetic treatment as outlined for the adult. If there be abscesses they should be evacuated. If infection is the cause then we must depend upon internal medication. Occasional doses of calomel render good service in early

stages. The gastro-enteric system succumbs easily to the influence of the bacillus, and the diarrhea may be overcome by the use of castor oil, followed by subgallate of bismuth and carbonate of guaiacol. High enemata should be used, while vomiting is generally relieved by subnitrate of bismuth, oxalate of cerium and essence of pepsin. We should not omit to say that the patient should be put to bed and given a nutritious, yet light and digestible diet. Milk food should cease temporarily. Headache, restlessness and fever call for sponging with cool water. In young children tr. of iron well diluted may better the condition of the throat. It should be given internally. The nose and throat should be kept clean by the use of an antiseptic spray with the atomizer. If these parts are kept free it will be a means of warding off many of the complications. In case any opium is given it should be used cauticusly indeed. Maintain the action of the kidneys by use of spirits of nitrous ether, and the sponging will take care of the skin. Chloral in small doses and perhaps bromide of sodium will calm nervous manifestations even at times when convulsions seem imminent. From the fact that endocarditis is sometimes present it should be borne in mind in outlining the medication. While there is frequently albumin in the urine, if there is no edema no especial treatment is required. Older children may be given mono-bromate of camphor and acetanilid compound, and at any age prostration may require the use of strychnia, caffein, digitalin or spartein. Alcohol baths may be used at any time. They will refresh the patient, act as a food to the skin and keep it clean, as well as acting as an aid in overcoming depression. Whisky or brandy has been a commonplace remedy at any stage of the disease, but I am very sure that in the treatment of children we should do without it because the disease produces a gastro-intestinal irritability. Whisky adds fuel to the flame, so that if possible I think it should be interdicted.

SYMPTOMATOLOGY AND DIAGNOSIS OF INFLUENZA.

BY FRANK O. DORSEY, M. D., INDIANAPOLIS.

Dr. W. Gilman Thompson defines influenza as an acute endemic epidemic and sometimes pandemic infection, characterized by catarrhal inflammation of the mucous membranes of the upper air passages, profound physical and mental depression and a tendency to serious pulmonary, gastro-intestinal and nervous complications.

The incubation period is short; sometimes the disease seems to develop in a few hours—usually in two or three days. Rarely there are prodromata of brief duration, of lassitude and dullness.

The invasion is abrupt, oftentimes, one might say, instantaneous. Goodhart relates "A medical man going to bed perfectly well and rising in the night to void urine, fell to the ground, and was so weak that he was unable to get into bed again without assistance. Also of another man who was out in his dog cart driving and quite well. He suddenly fell out insensible. He was picked up, got into the cart and drove himself home, but although he had broken a rib he remembered nothing about the drive, and when he arrived was so dazed that he wanted to get into bed with his boots on, and was thought to be intoxicated."

The invasion is often marked by a distinct chill of varying intensity and time, always by chilly sensations, particularly up and down the back. Patients speak of feeling as if some one were pouring ice water along the spine. Simultaneously there developes the characteristic aching, which seems to include every tissue, the skin, muscles and bones. The aching is most marked in the head, back and legs. There is pain about the eyes and aching even referred back into the sockets. There is in all marked cases the sudden rise in temperature to 102-4 degrees, which, with the chill, so often suggests the onset of pneumonia. With the temperature are its usual symptoms. The patient looks ill, the skin is hot and dry, the face perhaps flushed; there may be herpes labialis; the tongue quickly becomes coated with a

whitish fur, is flabby and tremulous and indented bv the teeth. Thirst is complained of; there is complete anorexia, often nausea and sometimes vomiting, which may persist for hours and even two or three days. The bowels are usually somewhat constipated, although in some types of the disease there is diarrhea.

The heart is more rapid, the pulse full and bounding, and in severe cases often rapid and weak even early in the attack. The respirations are always somewhat quickened. There is coryza, with sneezing and lachrymation, loss of taste and smell, and early manifestation of the obstinate dry cough from the bronchial irritation. The nervous system shows the most profound impression from the toxines early in the disease. There is always depression, and patients complain of being "all in." There is often restlessness and irritability, and sometimes delirium, even suggestive of a meningitis. The nervous depression is common to all types of the disease, and is one of the most persistent symptoms, and only too often continues long after the disease has run its course, and may end in melancholia or even mania. Suicidal tendencies are sometimes developed. The urine is reduced in amount, sometimes scanty. highly colored, increased specific gravity, and in severe cases there may be albuminuria. The temperature usually remains elevated two or three to five or six days, and returns to normal by lysis. The symptoms gradually lessen with the temperature. As the temperature goes down there is apt to be marked sweating, particularly on any slight exertion. Then after a few days of weakness the patient recovers. In more severe cases recovery is delayed even two or three weeks with disturbed digestion, mental depression and lassitude.

The manifold symptoms of the disease are best appreciated if we remember that they are produced by the constitutional effect of the general infection or toxine, and also local lesions with local symptoms. From these local symptoms the disease is described under various forms.

The respiratory or catarrhal form of the disease is marked by inflammation of the mucous membranes of the air passages, with coryza, pharyngitis and bronchitis always present, and often laryngitis and pneumonia. The pneumonia of influenza is caused by the pneumococcus and other organisms, so that it has been called a complication, but at times the bacillus of Pfeiffer is

found, showing it to be a part of the primary disease. Its progress is slow, starting from small areas and increasing to incomplete consolidation. The physical signs may be slow in reaching the surface or may be absent altogether, with central consolidation. The respirations increase in number more slowly than with a lobar pneumonia, and there may be absence of rusty expectoration. The inflammation may be confined to one lobe or extend to two or more lobes, the fever continuing, and the patient becoming more and more exhausted and apt to come to a fatal termination, or if able to withstand the attack the consolidation begins to undergo softening and absorption, and gradually disappears by lysis. There is some dry pleurisy if the pneumonic inflammation reaches the surface of the lung, or there may be pleurisy even without pneumonia, dry, serous or purulent.

The common type of influenza usually passes into the catarrhal form with the bronchial irritation which persists after the temperature is normal. The viscid mucous becomes less glutinous and the cough loosens with increased expectoration. The respirations may be much increased in number even without pneumonia, and there may be more dyspnoea than is explained by physical signs.

The nervous type of the disease may be ushered in by intense headache, frontal in character. Neuralgia is frequent, following the areas of particular nerves. There is general prostration, both mental and physical, out of all proportion to the severity of the disease, and severe aching pains, subjective sensations of all sorts. Delirium with hallucinations may occur; after two or three days the symptoms gradually abate, but with a tendency to neuritis, which may attack the legs, arms or face, or produce nephralgia or neuralgia of the testis. This condition may be protracted even for weeks, with pain and tenderness along the nerves and sometimes swelling. Thompson states: "Encephalitis, with hemiplegia and cerebral abscess, has been met with, as well as melancholia and dementia."

In the abdominal type of the disease, in addition to the general constitutional symptoms of fever, the characteristic aching of the head and limbs, there is disturbance of the intestinal tract of varying degrees. There may be simply soreness of the abdomen, with watery discharges from the bowel, or colicky pains with

rumbling of gas, or pain and tenderness even suggestive of peritonitis or appendicitis. Rarely these cases are choleraic in character, with numerous watery stools accompanied with abdominal distress and pain and severe prostration from exhaustion. Jaundice may occur if the inflammation affects the duodenum.

Rarely the toxine seems to be of a more virulent type, and exerts its baneful influence with full force upon the heart, causing a rapid, feeble and irregular action, with a tendency to syncope and collapse, marked by pallor, rapid, feeble pulse, great exhaustion and clammy perspiration. There may be praecordial pain; acute dilatation of the heart has been reported. The rapid pulse is apt to persist through convalescence, and permanent tachycardia has resulted. Pulse rates of 40 and 50 have also been met with. In connection with the circulation Goodhart reports seven cases of thrombosis of the larger veins of the extremities in his own practice.

Some cases of influenza are characterized by fever alone. These patients complain little or not at all of headache or general pains. The temperature may be slight and the patient able to continue at work, or it may be 103 or 104 and persist for days or even two or three weeks. There can be no doubt but what the disease sometimes runs its course without any temperature. In some epidemics various rashes of the skin are common. Influenza may stimulate acute cerebro-spinal meningitis, with photophobia, pain, tenderness and stiffness of muscles of the back of the neck, headache, delirium and even convulsions.

Although certain types of this disease are described, it must be remembered that the various kinds shade off one into the other, and often in a complex way, and few diseases offer such variety of symptoms as does influenza. The various forms of the disease stimulate ordinary inflammations and diseases, and many times can be recognized only by the knowledge of a prevailing epidemic.

The medical profession have much more respect for this common foe of mankind than formerly, on account of the lasting results which are so frequent. Many victims remark, as Goodhart says, "I had the influenza and have never been well since."

The complications and sequelae are numerous, in fact, almost no tissue in the body is exempt from attack in this disease.

The catarrhal form is frequently complicated by otitis media, severe bronchitis, pleurisy, pneumonia, the latter characterized by its slow and insidious invasion, temperature apt to be low and even remittent, bronchitis very marked, great weakness of heart action, tendency to spread from one part of the lung to another, frequent absence of rusty sputum, absence of abrupt ending by crisis and delayed resolution.

Tachycardia and brachycardia have been mentioned; there may also occur angina pectoris, pericarditis, myo and endocarditis, even ulcerative in type. Albuminuria, haematuria and nephritis. Thrombo-phlebitis. Permanent mental disturbance of various kinds; iritis, optic neuritis and conjunctivitis; abscesses may occur in various parts of the body. Boulting reports four cases of myxoedema which he believes followed influenza as a cause, and acute thyroiditis has been reported at least twice.

In a typical case of influenza of the catarrhal type within thirty-six hours of the invasion there was intense pain in the left middle ear, for which the patient took several 1/8 grain doses of morphine and used poultices so hot that the external ear was blistered and oedematous in her effort to get relief. On the third day the membrane partially ruptured, and was further opened by paracentisis. Twenty-four hours later the patient had a chill lasting one hour, which marked the beginning of an erysipelatous infection of the blistered auricle. The erysipelas traveled over the entire head and scalp, and continued for eight days, when a slow, tedious convalescence began.

Any existing organic trouble, even though latent, respiratory, cardiac or renal, or any wasting disease, particularly tuberculosis, is apt to light up and may terminate fatally when complicated by influenza. Some epidemics are more fatal than others, and the mortality is always increased during their prevalence. No age is exempt, and the disease uncomplicated is rarely fatal except to infants and the aged.

Diagnosis of most cases is simple, but often it is extremely difficult, and sometimes can be made only after the acute attack is past by the prolonged depression or a persistent neuritis. Diagnosis is based upon the prevalence of an epidemic with catarrhal symptoms, accompanied by prostration. Acute coryza or catarrh is more frequent in spring and fall, and accompanies changes in

the weather. The mucous discharges should be examined bacteriologically, attention paid to the severe pains, the neuritis, persistent irritable cough and mental depression and prostration out of proportion to the severity of the attack, the moist, dirty, creamy fur on a flabby and tremulous tongue, tendency to profuse sweats and indefinite, irregular temperature.

Sahli doubts the causative relation between the bacillus of Pfeiffer and influenza, and claims that it has not been found in late years in so-called attacks of influenza, but that great numbers of Frankel's pneumococci are found even with no signs of pneumonia. He says: "If the influenza observed in the nineties be regarded as a specific disease produced by the influenza bacillus it might be well to discontinue using the term influenza for these pneumococci infections and common catarrhal conditions."

The invasion of influenza and typhoid may be similar, marked by headache, chilliness, aching and prostration, and it is claimed that the two diseases may be associated in the same individual. In influenza the spleen may be enlarged, but not as much so as in typhoid. Epistaxis is rare, there are no rose spots, and the Widal test is negative. The temperature is not as regular as in typhoid; there is not the same tendency to the dry, brown and fissured tongue, nor as deep apathy as in typhoid. However, the febrile type of influenza, which sometimes continues two or three or even more weeks, may be very difficult to differentiate from enteric fever.

Dengue is differentiated by being confined to certain localities, occurring in hot seasons, by the remissions in temperature, frequent relapses and the frequent skin rash.

The nervous type may simulate epidemic cerebro-spinal meningitis very closely—the delirium, stiffness and rigidity of the neck, sudden onset and intense headache. Attention must be paid to the prevailing epidemic, the course of the disease, the tendency to catarrh in influenza and to bacteriological examinations.

An interesting feature in the study of disease is the question of "change of type." Former accounts of epidemics of influenza agree quite perfectly with the disease as it is seen today, but there is nothing recorded of the subsequent varied effects upon the nervous system with which we are so well acquainted. Is

this due to faulty medical record, or have we in the march of civilization developed a more sensitive nervous system which is less able to resist the toxines of the disease? This must be an open question for the future to decide.

DISCUSSION DR. DORSEY'S AND DR. EARP'S PAPERS ON INFLUENZA.

Dr. F. B. Wynn: Influenza is not a new disease; it has come to everybody, and we are prone to look upon it as a simple, insignificant disease, and sometimes speak lightly of it, yet I believe that this disease is one of major importance.

We are all familiar with the symptom, often spoken of as the "grippe ache," that people talk about, and if there is one point above another distinguishing the disease it is this. There is likewise a tenderness and a soreness. How well you recall the feeling in your eyeballs, and how sore the muscles in the back were if pressed upon. What does this tenderness and aching signify? I interpret it as due to toxaemia circulating through the system. An inflammation of the muscles arises and then it hurts you to stoop over or to make ny pressure on the muscles.

And now in reference to the treatment of this disease. I think this is the place above all others where we may prudently and successfully administer the coal tar products. Certainly in my hands I have found the judicious administration of these remedies for the toxaemia, with its pain and soreness, to yield most satisfactory results.

Now what I wish to address my remarks to are two maladies markedly influenced by influenza. The first is tuberculosis. When you first come upon a patient with this disease and ask him when it began he will almost invariably date the onset of the trouble from a grippe cold, when as a matter of fact the tuberculosis did not begin at that ime at all, but was changed from a latent to a more active process. Almost invariably if you will watch you will find that tuberculosis is brought to the physician's attention as a mixed infection.

Second, I wish to call attention to la grippe as a factor in hastening the break in organic heart disease. I do not mean that influenza is the cause of heart disease except in rare instances. What I do mean to say is that in organic valvular disease when the break comes you can frequently date it back to the appear-

ance of the grippe. How did this cause it? By the same toxaemia of which I spoke at the first, which gave rise to muscular soreness. I invariably say to the man who has organic heart trouble that he must be careful not to contract cold, influenza or pneumonia, and hence he should be very careful not to associate with the other members of the family suffering from these diseases lest he become infected and a break in compensation arise.

Dr. Earp: I was glad that Dr. Wynn spoke on my paper. I called attention to the use of an astringent compound, and the other was in reference to the slumbering condition of some chronic lesions which are brought to life by influenza. This was not enlarged upon on account of the limit of time, and therefore I did not refer to the cases wherein there was a tubercular condition and at a later period aroused to activity, resulting in pulmonary hemorrhage, so that both in the heart, lungs and kidneys disease is manifested which has been running for years, months or weeks, and when there is an attack of influenza very frequently it comes up cyclonic in character, and then as a rule we have some one to die from the condition of the heart, lungs or kidneys.

HEART-BLOCK.

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While the mass of literature bearing upon the condition known as heart-block has grown to such proportions that I can not hope to collect it in a single paper without making unpardonable demand upon your patience, yet this literature is at present somewhat scattered, and I have felt that it may be of profit to attempt an orderly review of the articles within my reach, making, of course, no effort for originality, since my personal experience has been limited to the observation of one or two cases of the Adams-Stokes Syndrome.

Heart-block, or atrioventricular allorhythmia, may be defined as an interference with or blocking of the contraction wave passing from auricle to ventricle, so that there is produced dissociation of auricular and ventricular rhythm, i. e., independent systole of auricle and ventricle.

In order to study intelligently this condition it is necessary that we review briefly certain points bearing upon the physiology of the heart.

Physiologists are generally agreed that the contraction wave of the heart starts at the great veins opening into the right and left auricles and progresses in an orderly succession in the direction of the muscle fibres from auricle to apex, finally reaching the deeper layers and the papillary muscles, although to the eye the ventricular systole is apparently simultaneous. In regard to the cause and sequence of the heart beat I shall quote, though not literally or consecutively, from W. H. Howell's text-book of physiology as follows:

"While the heart-beat is controlled and influenced constantly by the central nervous system, it has been established beyond all question that the heart continues to beat when all connection with the central nervous system is severed. The central nervous system regulates the activity of the heart-beat, but does not have

anything to do with its rhythmical contractions, the contraction itself being an inherent automatic property of the heart."

For many years the explanation of this property of automaticity has been sought, and while no theory has given any actual solution of the automaticity itself, yet two views have been put forward to explain the rhythmicity of the heart-beat, namely, the neurogenic and myogenic.

The first, or neurogenic, theory had its origin in 1884, when Remak discovered that nerve cells are contained in the frog's heart, and subsequent histological work has demonstrated their existence in the tissue of all vertebrate hearts. This theory assumes for the heart an intrinsic central nervous system with a chief motor center lying near the venous end of the heart and subordinate centers scattered through the muscles, the contraction impulse arising automatically in the chief center, and being transmitted by the nerve fibers to the muscle cells in an orderly succession.

The myogenic theory of the heart-beat, developed principally by Gaskell and Engelmann, assumes that the heart muscle itself possesses the property of automaticity, and that this property is developed most highly at the venous end, which consequently contracts first, the wave resulting directly through continuity of muscle. It is further believed by the supporters of this view that the nerve cells and fibers present in the heart are connected with the extrinsic cardiac nerves, and hence concerned with the regulation, but not with the production, of the beat.

More recently the influence of ions of potassium, sodium and calcium upon the production and maintenance of the heart-beat has been the subject of much interesting work.

Without attempting to review the many findings for or against any of these theories it is of great importance to note that in a recent article Dr. Wesley Mills, of Toronto, expresses the view that in the higher vertebrates the heart-beat is not due to any one factor exclusively, but that chemical, muscular and nervous factors all enter into its results.

The myogenists found their chief stumbling block in the fact that no muscular connection between the auricles and ventricles had been demonstrated until in 1893. His, jr., exactly localized a definite muscular bundle connecting the septum of the auricles

with the septum of the ventricles, and while practically no notice of this work was taken until 1904, it has since that time been the subject of much study and research, especially by Retzer, Braeunig, Humblet and Tawara.

The demonstration of such a muscular connection between the auricles and ventricles has done much to strengthen the contention of the myogenists and furnish explanation for the normal slight pause between auricular and ventricular systoles, since it has been shown that the narrowing of the area of muscle-wave path causes delay in transmission of the impulse.

For a description of the auriculo-ventricular bundle of His I shall quote the free translation of Retzer's work given by Dr. Joseph Erlanger in the Journal of Experimental Medicine as follows:

"When viewed from the left side the bundle lies just above the muscular septum of the ventricles and below the membranous septum. In some hearts the muscular septum is so well developed that it envelopes the bundle; it is then difficult to find it. But occasionally it can be seen directly by transmitted light. From the left side the bundle can be followed posteriorly no farther than the right fibrous trigone, for here the connective tissue becomes so dense that it is difficult to dissect it away. The impression is therefore received that this mass of connective tissue forms the point of insertion of the bundle. The bundle may be followed anteriorily until it becomes intimately mixed with the musculature of the ventricles, and, according to Tawara, it here divides, one part passing down the right side of the septum, the other down the left side.

"When viewed from the right side of the heart the bundle can not be seen, because it is covered by the mesial leaflet of the tricuspid valve, whose line of attachment passes obliquely over the membranous septum To expose the bundle this leaflet must be cut away from the membranous septum. Then, if the endocardium is removed from the posterior part of the septum of the auricles up to the membranous septum, the posterior part of the auriculoventricular bundle will be exposed. If in addition the membranous septum be removed the bundle may be traced from the point to which it could be followed when viewed from the left side as it passes posteriorily over the muscular septum. In the

region of the auriculo-ventricular junction it loses its compactness, the fibers divide and the bundle seems to fork. One branch passes into the superficial part of the valve musculature, which descends from the auricles, and the other branch passes directly into the musculature of the auricle. In the heart of the adult the bundle is 18 mm. long, 2.5 mm. wide and 1.5 mm. thick."

Here, then, we have an exact description of a definite structure establishing the anatomical connection of or continuity between the auricles and ventricles. That this path is a muscular one is established by histological methods, although Tawara believes it differs from the rest of the heart muscle and is composed of Purkinje fibers, being a part of the system of Purkinje fibers that ramify through the heart muscle. Retzer, after careful examination of serial sections made from the region of the bundle, announces that there are no nerve trunks present, and His states that there are no nerves in the bundle.

If the auriculo-ventricular bundle of His is the path for the transmission from the auricle of the stimulus which normally brings about contraction of the ventricle, it should be true that destruction of this path will block the stimulus and produce independent rhythm of auricle and ventricle.

Numerous attempts to accomplish this in animals have been made by different investigators, but with varying success until Erlanger, by a specially devised clamp for compressing the auriculo-ventricular bundle and the tissues immediately surrounding it in the septum, was able to produce very uniform, either gradual or sudden, partial or complete, compression.

Briefly stated, his results, as published by him in the Journal of Experimental Medicine, 1906, and the Journal of the American Medical Associatoin, October 27, 1906, are as follows:

Gradual compression of the bundle at first produces a slight increase in the interval between the auricular and ventricular systole, this being the first sign of heart-block. As the compression is increased a point is reached when the ventricle fails to contract in response to a certain auricular contraction, but following this ventricular "silence" the intersystolic period is again short, but begins to lengthen again until another ventricular beat is dropped; this may be regulated by varying degrees of compression until one ventricular beat may be lost at will in 10, 9

or 8, etc., auricular beats. As the compression is still further increased more complete block or interference with the transmission of the impulse is obtained until only every second, third or fourth auricular systole is followed by a ventricular contraction. Usually, however, should the third auricular systole fail to stimulate the ventricle it contracts spontaneously, hence it is evident that the ventricle may beat independently of the auricle. This state is termed "relative complete block." When the compression becomes such that no stimulus whatever can pass through the bundle to the ventricle the block becomes absolute, and the ventricle pulsates with a rhythm entirely independent of that of the auricle by reason of its inherent rhythmicity.

In partial block the weakened stimulus from the auricle is insufficient to cause ventricular contraction until the growing irritability of the ventricular muscle has reached a degree that responds to the hitherto futile auricular stimulus, i. e., the ventricular irritability rises to a point that intercepts the auricular impulse—hence the lengthening of the normal intersystolic period.

In relative complete block the ventricle contracts by its inherent rhythmicity after a certain number of auricular systoles have failed to stimulate it, and hence beats independently of the auricle.

In absolute complete block, when produced suddenly, the ventricles may stop beating for as long as seventy seconds before beginning their independent rhythm, since, while driven by the auricles, it is assumed that the inherent rhythmicity of the ventricles lies dormant, and when the auricular impulse is withdrawn the ventricle ceases to beat until this inherent rhythmicity is developed.

Erlanger makes this beautifully clear by an ingenious diagram.

The clinical application of this study becomes apparent when we turn to a consideration of pathological variation of pulse frequency, and especially of that most interesting condition long known as the Stokes-Adams, or more properly, as the Adams-Stokes syndrome, the well known cardinal symptoms of which are especially well formulated by Erlanger, i. e.:

"(1) A slow impulse, sometimes associated with pulsations of the veins of the neck, which may be more than twice as frequent as the manifest beats of the ventricles.

"(2) Syncopal attacks, which may be epileptiform or apoplectiform in character, and in which the pulse rate is unusually slow."

The literature on this subject has been carefully collected and presented in a paper by Bassoe read before the Chicago Pathological Society in April, 1903, and briefly is as follows:

In 1827 Adams, of Dublin, reported a case of bradycardia in a physician sixty-eight years old, in which the autopsy showed fatty heart and extreme arterio-sclerosis. Stokes in 1854 reported a case with onset at sixty-five years of age; this patient had attacks of unconsciousness and a pulse rate of 28; fatty heart was considered the cause.

Other cases were reported by Andral in 1834, and Halberton in 1841, the latter being of interest since the medulla oblongata was considered the possible seat of the cause. Similar cases were reported from time to time and credit was not given to Adams and Stokes until Huchard in 1893 proposed the name Stokes-Adams disease.

Bassoe's article is of great value in its reference to eitology. He finds that Huchard considered the disease to be due to arterio-sclerosis particularly of the coronary vessels and medulla oblongata. Recent investigations have shown that the disease may exist without arterio-sclerosis.

In regard to the age at onset, while most frequent in advanced years there are exceptions, one case being reported in a child of four years, and another in a woman of twenty-three years.

He finds a case reported by Neuberger and Edinger in which there was a varix in the region of the decussation of the pyramids which compressed the upper roots of the accessorius, and he believes this case lends support to the view that the cardio-inhibitory fibers of the vagus are derived from the accessorious.

In a case he quotes as reported by Luce the autopsy showed a round celled sarcoma occupying the upper third of the ventricular septum. Nothing abnormal was found in a most painstaking examination of the entire medulla and upper cervical cord, and while both vagi were markedly degenerated outside of the medulla he was of the opinion that the degeneration was ascending and due to the tumor in the septum. In yet another case reported by Lacquer and Weigert groups of tumor cells were found

in the thymus. In Bassoes' own case there was thinning of the upper part of the ventricular septum which microscopically proved to be made up largely of fibrous tissue; there was considerable perivascular collection of round cells here.

The more recent literature contains reference to this condition arising in the myocarditis of acute rheumatism, pneumonia, typhoid, etc. Jellick, Cooper and Ophuls lately have reported a case of acute epididymitis, probably gonorrhoeal, leading to septicaemic symptoms, in the course of which the Adams-Stokes syndrome appeared. The autopsy showed anaemic necrosis of the muscular septum in the region of the bundle of His consequent upon a recent thrombosis of the nutrient arteries to this region.

It is impossible for me to even attempt to collect all the published cases of Adams-Stokes disease, but in reading such reports as have been at my command I am struck by the frequency with which, among the most diversified pathological findings, some lesion is found in or near the region of the bundle of His. This is true even in the earlier reports, and since the more definite localization of this auriculo-ventricular bundle the four cases of Adams-Stokes disease that have come to autopsy have all shown disease of this structure, so that Erlanger concludes that—

"(1) All of the cardinal symptoms of Stokes-Adams disease may be duplicated by heart-block resulting from a lesion in or near the bundle of His and by this alone.

"(2) No typical case of Stokes-Adams disease has been described in which heart-block might not have been the cause of the trouble.

"(3) It can be shown that all cases of Stokes-Adams disease which have been studied by sufficiently accurate means were cases of heart-block."

Beyond the bare statement that the cardinal symptoms of this disease consist of extreme bradycardia associated with syncopal attacks of epileptiform character, not much need be said in the matter of symptomalogy. However, the diagnosis is of interest.

The bradycardia is the essential symptom and this must be proved to be true bradycardia since we are liable to the error of accepting the radial pulse as a true indicator of ventricular contraction.

I have recently observed a radial pulse of extreme slowness

which after careful praecordial auscultation proved to be a typical "pulsus alternans," the intermediate beat being heard at the apex as an extremely faint, muffled tone exactly interposed between those systoles producing the radial pulse, the entire praecordial count just doubling the radial. This condition is met with fairly frequently and seems to have been a source of error in many of the earlier cases reported.

In a case of true Adams-Stokes disease, listening over the praecordium, the slow, usually regular, ventricular sound is heard, and over the base may at times be heard a faint, uncertain one that is attributed to the auricles and synchronous, with which may be seen a pulsation in the cervical veins which is of greater frequency than the ventricular tone. The relative frequency varies, depending upon the degree of block, since partial block may occur and is probably present in the early stages of most cases, one ventricular contraction being lost for different numbers of auricular. However, in well-advanced cases where complete block has become established, the auricular systoles may be shown to more than double those of the ventricle.

While this essential sign may be made out unmistakably by ordinary clinical methods, the ideal examination consists in simultaneous tracings taken from the apex beat, cervical venous pulse and radial artery, the drawback to this method lying in the rather complicated apparatus required.' However, an instrument devised and recently described by Dr. G. W. McCaskey of Fort Wayne would seem to obviate this difficulty since it does away with tracings, the pulsations from two tambours applied to the apex and cervical veins being communicated to two levers whose oscillations may be immediately compared.

For a long time it was believed that the Adams-Stokes syndrome was not a clinical entity since it appears that any or all of the findings might occur in a number of different pathological conditions, but it is now well established that bradycardia, with auriculo-ventricular dissociation such as we recognize in this disease, can occur only through a lesion of the bundle of His.

While, as has been said, the syncopal attacks are not necessary features of this condition since they occur in many others, yet in the absence of other direct cause for them it is interesting to know the method of their production in relation to the condition

of the heart. Erlanger refers to Webster as "first calling attention to the fact that the epileptiform seizures of Stokes-Adams disease may be caused by the anaemia of the brain resulting from failure of the heart to supply a sufficient quantiy of blood," and he says that Kussmaul and Tenner have shown that "venous congestion of the brain as well as arterio-venous congestion brings about conditions which belong more to those of apoplexy than to those of epilepsy," and also that "this state of affairs might obtain in those syncopal attacks in which slowing of the ventricles is not sufficient to cause convulsions but will just cause complete unconsciousness."

The prognosis of this disease is very grave unless perhaps in those cases in which it has arisen during some acute infectious disease, when it is possibly a part of a diffuse acute myocarditis and as such capable of functional recovery, or, again, when arising from syphilitic disease of the ventricular septum. In any case, however, where absolute block has become established, it seems to me hardly to be expected that an individual can long survive by the inherent rhythmicity of the ventricle alone.

Many interesting aspects of this subject must of necessity be here omitted, especially the relation of the extrinsic nerves and the influence of drugs upon the bradycardia and the ability of digitalis and strychnia to produce it.

As attention is more generally called to this subject, the cases reported will multiply rapidly in number as do those of all conditions the previously obscure etiology of which has become elucidated. And we should be especially observant of the bradycardia arising during acute infectious processes, bearing in mind that the syncopal manifestations may not arise while the patient remains in the recumbent position.

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RUDIMENTARY ORGANS.

BY A. G. POHLMAN, M. D., OF BLOOMINGTON.

The physician must be a student of evolution and selection because he is the enemy of evolution. The human family has wandered so far away from the ancestral environment that it needs assistance to survive in the struggle for existence. We can never hope to build up the perfect man by selecting the "unfit," and many of those "unfit" are a result of false environment, of domestication, civilization. Viewed in the light of his domesticated state, the ancestry of man is an all-important factor. His structural basis is one that shows the earmarks of his past, and it is this evolutionary complement that rescues the subject of anatomy from being a symposium of technicalities. Rudimentary organs are usually treated as a stepchild, if at all, in the text-books on anatomy. In fact, the only important work on this subject, lamentably unknown, is that of Wiedersheim on the "Origin of Man." We are all willing to grant that man is not structurally perfect. The separation of man into brain and body is far too evident. The brain is quite contented as long as the body is unconscious, and when the body becomes a conscious element the individual comes to the physician. Rudimentary organs bring about this bodily consciousness either in a physical or a psychical way—they affect the physical welfare or they occasion physical discomfort.

Rudimentary organs may be defined as those organs theoretically useless to adult man which functionated in the past—near or remote. They may be classified in the order of their frequency in occurrence:

A. Normal persistence of organs functional in the fetus.

B. Normal occurrence of organs of no known function in man.

C. Abnormal rudiments due to lack of degeneration in fetel parts.

D. Abnormal rudiments of no known function.

It would be difficult to present the subject in a systematic man-

ner, taking up the various systems of the body in detail. There would be far too much chaff to thresh over before a kernel of truth was discovered. I take the liberty in rambling, both in your interests and in my own. Many of the points are of no practical importance and may have no particular influence on the possessor's immediate welfare or happiness.

The change from the fetal to the adult circulation is well known to all of us. Practically it amounts to this: The child must abandon the parasitic habit and rely upon its own organs—the lungs must oxygenate the blood, the portal system must be closed, and the kidneys take up the function of excretion. A patent vessel when tied plugs to the first collateral branch, and for this reason the umbilical vein and arteries rarely give trouble except to the dissectors—the Plicae umbilicales, perhaps, are of interest to the surgeon as a factor in the predisposition to hernia. The continuation of the umbilical vein, the Ductus venosus, probably always plugs to prevent mixing of the portal and systemic circulation, which would undoubtedly kill the child at the first nursing. The two remaining fetal parts may be considered an unimportant and an important one as far as the viability of the child is concerned. The former is a persistence of the foramen ovale—an orifice that is supposed to allow the arterial blood flowing up the inferior vena cava to gain the left auricle. I say "supposed" intentionally. I question the possibility on a physical basis—and the necessity on an embryological basis—a matter too detailed to bring out in so short a paper. The foramen persists frequently and because of the equal auricular pressure occasions no disturbance—it might, however, be a disturbing element in mitral disease.

The most important rudimentary organ in the circulatory system is the ductus arteriosus—a fetal structure that is liable to remain patent for two reasons: Its wide lumen and shortness, and secondly, because it represents the sixth branchial arch—a mechanical and reversional factor. The patent ductus arteriosus is incompatible with life if the mixing of the pulmonary and systemic circulation is marked—the "blue baby." The prognosis for an infant so afflicted is poor, even if it survives for a time, and personally I see no reason why the daring surgeon should not put a stitch in the duct. A dangerous operation—opening

the chest and working in cramped quarters in a dangerous region; some day it may be done because it is possible to do it.

The very young human embryo is provided with a limited amount of yolk which its digestive tract engulfs. While the yolk sac is absorbing the nutrition contained, a sprout is developed from the caudal gut to carry blood vessels out to the uterine wall to replace a chronic circulation by a placenta. This hollow diverticulum—the allantois—functionates in the bird as a sort of urinary reservoir—excretion within the shell. In the mammal it persists as a cord leading from the summit of the bladder to the navel—urachus*—and may occasionally persist to form an umbilical fistula. The yolk sac in its absorption becomes distally placed on the primary intestinal loop, and communicates by a slender duct with the lower part of the ileum. This duct may persist or the vessels surrounding it may not degenerate completely, and the result is a diverticulum or cord leading from the small bowel to the umbilicus—Meckel's diverticulum. It was found present in something like 2 per cent of all cases, either as a gut diverticulum or a fibrous cord—usually the latter and more frequently in the male (9 to 1). It appears that when the diverticulum is large it offers mechanical obstruction to the rotation of the large gut with resulting congenital displacement of the colon and caecum. Like the allantois, it may extend out into the cord some distance when patent and predispose to a fecal fistula. The danger of the Meckel diverticulum is evident.

The stellar rudimentary organ for the physician is naturally the appendix—a remnant of the distal segment of the caecum, and interesting from all points of view. Herbiverous animals with small stomachs have large caecae (horse), while those with large stomachs have small caecae (cow). Carnivorous and omnivorous animals have small stomachs and small caecae (dog, pig). The kangaroc and the primates show a degeneration of the distal caecum to form an appendix. The degeneration of the caecum is quite evident in comparative anatomy as well as in embryology. I illustrate by chart (I) the relation of age to the length of the appendix; (II) percentage of occlusion according to age; and (III) relation of length to frequency of occlusion.

Couple these charts with the fact that the appendix possesses

*The writer questions this statement, and grants it to avoid detailed embryology.

a terminal artery and the possibilities suggested by domesticated life, the upright position, etc., and we have every indication to remove it when it becomes a disturbing element. We can never hope to eliminate appendicitis in future generations by its repeated removal, but we do assist the individual in adapting himself to his environment.

An occasional pocket is found on one or both sides of the nasal septum—Jacobson's organ. The diverticulum is laid down in every human embryo, although its office as an organ of smell was lost far back in the mammalian scale. I do not known that its persistence is anything more than a medical curiosity. Cervical fistulae may also be dismissed with a word—they are merely a persistence of the gill cleft system; only one cleft is functional in the human being, the first or Eustachian tube.

The thyroid gland is also of interest in that it leaves behind a normal rudiment of its mucous function—the caecal pocket just back of the circumvalate papillae. Occasionally the duct persists either as the ductus thyreoglossus or as a median cyst in the neck. Just so the larynx shows interesting rudiments in the cartilages and in the ventricles—the latter functionating as resonating chambers in some of our remote cousins. They are of interest anthropologically, but time does not permit consideration.

The lungs present evidences of rudimentation, as does the chest. I am not allowed time to discuss the degenerative changes in the chest or the influence on the type of respiration. I would like, however, some argument on what is the normal type of respiration in the human family. Personally I can not accept the generally conceded notion that the normal respiration is abdominal and that it is acquired thoracic in the female. My notion is just the reverse, that it is normally thoracic, and acquired abdominal in the male.

Time does not permit taking up the so-called tailed men, hairy men, the rudiments found in the central nervous system, the third lid, the under tongue, etc., and I will confine myself to the extremely interesting rudimentary organs of the genital tract.

Polymasty and polethely are important to the general practitioner. Developmentally, we may have breasts roughly from the axilla to the groin, and the normal paired breast of the human being may be supplemented by accessory nipples in the male or

nipples and breasts in the female. Strange to say, they appear to be distinctly reversional and are not hereditary. Studies on German recruits show that in 2,189 men, 66 had supernumerary nipples, paired in two cases. In addition to this about 50 had indications of nipples, making a proportion of about one to nineteen. One man had three pairs of accessory nipples—one above and two below the normal position. Accessory breasts in women are apparently not transmitted even when they are functionally perfect.

Rudiments about the genitals are extremely important and are fairly well understood. The primitive urinary system is the chief offender in the female (parovarian, paroophoron, and Gartner's duct). In the male Müllerian remains when well developed give rise to a sort of pseudohermaphroditism, and may be a factor in retention of the testis.

The number of actual rudimentary organs is legion, and I have brought out only those I believe to be of interest to the profession as a whole. The imparting of knowledge concerning them has been neglected, and that interest and observation may be awakened is the object of this paper.

DISCUSSION.

Dr. J. W. Sluss: I regret that the Doctor did not have time to read all of his paper. I think the essay should be given more attention. We think of these accessory organs in a sort of haphazard way and so fail to recognize the practical bearing of rudimentary structures. For instance, we know that at the base of the brain, as the essayist would probably have pointed out, we have two rudimentary structures, the pituitary body and the pineal gland, and doubtless they play more of a part in the functions of the brain and in nutrition than we are inclined to suppose. Then, again, we have the thymus gland, which is functionally active in the young, which begins to disappear at the end of the second year, and which must of necessity maintain some of its activity later on in life, and it may be that some of the obscure conditions we meet and which we are not able to definitely locate, may have their origin in a still functionating thymus

gland. We have in connection with the thyroid gland a pair of minute structures, the parathyroids, which seem to have functional activity in infancy, and which have, so far as we know, no real function in adult life. Diseases of these structures may be found to produce derangements of function. These matters are well worthy of our thought, and researches may in the next few years explain many things that are rather mysterious to us now.

TUBERCULOSIS: A HISTORICAL SKETCH.

BY JONAS STEWART, M. D., OF ANDERSON.

The task has been assigned me of sketching the history of tuberculosis, the most dangerous enemy of the human race. Of all the death-dealing agents which destroy the physical life of man, tuberculosis is the most potent and destructive. Osler has called pneumonia "one of the captains of the men of death." If this military title is appropriate, we may not inaptly designate tuberculosis the "general" of these destructive forces.

In the past centuries of the world's history men have beheld with horror the ravages of war, famine and pestilence. Countless thousands have been swept away by epidemics of cholera, typhus, smallpox and the plague, or black death, of the middle ages, but none of these has claimed so many victims as tuberculosis. If we exclude death from old age, uncomplicated by disease—a very rare phenomenon—one in every seven is caused by tuberculosis. Of adult deaths only, probably every third, at least every fourth, is from consumption. Nearly one-half of all deaths in the British Isles, of persons between the ages of twenty-five and thirty-five, are caused by this disease. It is in the early period of adult life, in the very prime of manhood and womanhood, that the most of its deadly work is done. At the period when life is most useful, considered from an economic standpoint, its greatest destruction is wrought. When young people are looking forward with bright anticipations of useful and happy lives, when husbands have families depending upon them for support, when mothers are most needed to care for their children, at the age when the best and most important work of life should be done, is when this death-dealing enemy of our race is most active. It might be profitable to pause for a moment to consider the extent of its awful ravages. There are one hundred fifty thousand deaths from this disease every year in the United States alone. The population of this country is probably less than one-twentieth of the population of the whole earth. Conceding that the death

rate in America is about an average, there is an annual loss of three millions of lives from this one cause. In his recent work on "Consumption and Civilization," Huber places the annual loss from this disease, in the whole world, at five millions. But if only the lower estimate be correct, three hundred millions die of this disease in one century. It is within the bounds of truth to say that the whole number of the victims of this insidious foe, during the twenty centuries since Julius Caesar led his victorious Roman legions into Gaul, is equal to three times the present population of the earth. If the estimate of Huber be used in the calculation, it would give us five times the number of people now living.

Tuberculosis is far more destructive than war. A reliable writer estimates the death roll of all the wars of the nineteenth century at fourteen millions; and for the same period, and in only the countries that were engaged in war, the death losses from consumption reached the enormous total of thirty millions, or more than twice the number lost in war.

The death of a few people from smallpox or yellow fever, in a community where they are not usually prevalent, immediately produces a panic among the citizens of a city or an entire state; and yet these same people regard with stolid indifference the ravages of this more dreadful scourge. If bubonic plague or Asiatic cholera should appear in our midst the greatest alarm would at once be felt by every one, and the business of the entire community would be demoralized; yet we pay little heed to a disease more deadly than either of these. The terrible "Black Death" existed one year in London and killed fifty thousand people. In England and Wales sixty thousand die every year from consumption.

These are all well-known facts concerning a disease of which a recent writer has said: "The things which cause them are no longer for us mysterious emanations from the sick, or incorporate expressions of malign forces, against which conjurations or prayers could alone promise protection; but they are particular beings, never self-engendered, never evolved in the body, always entering from without—things which we can see, and handle, and kill." (Prudden.)

But let us not here anticipate the goal to be reached at the end

of this "history," nor trespass upon the domain of those who are to follow; our present business is only with the history of the disease produced by the things "which we can see, and handle, and kill."

The beginning of this history is not a thing of yesterday. It is older than our American nation—older than the Christian era—it goes back to the beginning of all history and, like all history, is lost in the mists of antiquity. Tuberculosis has existed, if not ever since men began to die, surely since they began to live in houses and congregate in cities. But in our knowledge we can only go back to the beginning of medical history. This begins with Hippocrates, for as Herodotus was the father of history, so Hippocrates was the father of medicine, and was born only twenty-four years later than the great historian. He first saw the light on the Island of Cos four hundred sixty years before the beginning of our era He met the same potent, invisible enemy with which we now have to contend, and gave a description of the disease which it produces. It would probably be more appropriate to say he gave a description of the patients suffering from the disease. He described the symptons and gave evidence of its fatality in these words: "The most dangerous disease, and the one which proved fatal to the greatest number, was consumption." Twenty-three centuries have come and gone since he wrote these words, and still consumption is the most dangerous disease, and fatal to the greatest number. Other foes have been conquered, but, although the battle against this enemy has raged for more than two thousand years, the victory is not yet in sight. This is one of the achievements to which the profession does not "point with pride." Some progress, however, has been made, and this has been most rapid in recent years. It is the object of this essay to sketch, briefly, an outline of the successive stages of this progress, and ascertain, if possible, to whom the credit is due.

Returning, then, to the beginning, we note that Hippocrates, who accurately observed its clinical aspects, and could so clearly portray its symptoms, had but crude conceptions of the pathology of the disease. He believed it to be a suppuration of the lungs, and that this might be caused in various ways; as from the conversion of an inflammation, from an extravasation of blood, or

from an accumulation of mucus. The tubercles were not then recognized, and were wholly unknown to Hippocrates and his successors for several centuries.

Ariteus of Cappadocia, and Celsus, who has been called the Roman Hippocrates, both had the same conceptions of tuberculosis as those of the great Grecian. But Ariteus left a pen picture of the consumptive, in about 50 B. C., so true to the original that it is a marvel for that age, and I ask your indulgence to quote it in full:

"Voice hoarse, neck slightly bent, tender, not flexible, somewhat extended fingers, slender, but joints thick; of the bones alone the figure remains, for the fleshy parts are wasted; the nails of the fingers crooked; the pulps are shriveled and flat, for, owing to the loss of flesh, they neither retain their tension nor rotundity; and, owing to the same cause, the nails are bent, namely, because it is the compact flesh at their points which is intended as a support to them, and the tension thereof is like that of the solids. Nose sharp, slender; cheeks prominent and red; eyes hollow, brilliant and glittering; swollen, pale or livid is the countenance; the slender parts of the jaws rest on the teeth, as if smiling, otherwise of a cadaverous aspect. So, also, in all other respects, slender without flesh; the muscles of the arms imperceptible; not a vestige of the mammae: the nipples only to be seen; one may not count the ribs themselves, but easily trace them to their terminations, for even the articulations of the vertebrae are quite visible, and their connections with the sternum are also manifest; the intercostal spaces are hollow and rhomboidal, agreeably to the configuration of the bone; hypochondriac region lank and retracted; the abdomen and flanks contiguous to the spine; joints clearly developed, prominent, devoid of flesh; so also, with the tibia, ischicun and humerus; the spine of the vertebrae, formerly hollow, now protrudes, the muscles on either side being wasted; the whole shoulder blades apparent like the wings of birds."

A master of English could not excel this description, even at the present day.

The first great luminary in the medical world, after the beginning of the Christian era, was Galen, who lived from 131 to 201 A. D., and was physician to the great Marcus Aurelius, philosopher and Emperor of Rome. As to the subject in hand, even

Galen recognized only suppurations and ulcerations of the lungs, by which portions of these organs were sloughed off and discharged by expectoration. He added nothing to the knowledge of the nature or pathology of tuberculosis.

With the death of Marcus Aurelius, the patron of Galen, the glory of the great Roman Empire ended. Its decline began under the misrule of Commodus, his immediate successor, and culminated in its fall, less than three centuries later. From the conquest of Rome by the Goths, in A. D. 476, we date the beginning of the "Dark Ages," the thousand years of intellectual night which then settled down upon the world. During this period there was no medical progress, but rather decline. The little scientific advancement which had been made under the civilizations of Greece and Rome was almost totally eclipsed by the dense ignorance and superstitution which characterized that long and unhappy period. The only bright spot in the dark monotony of the Middle Ages, from a medical point of view, is the light thrown upon the somber screen by the learning of the Arabian physicians, especially those of the University of Bagdad, the most celebrated of whom were Rhazes and Avicenna. Rhazes taught that the suppuration of the lungs, which he deemed the essential factor in consumption, might result from hemoptysis, pneumonia, pleurisy, or an injury; and that patients died from it only because the lungs could not be treated by the actual cautery, as could the external portions of the body. And Avicenna made no advancement upon the teaching of Hippocrates, so far as we are informed, concerning the nature of tuberculosis, although he lived fifteen hundred years later.

We find, in fact, very little advancement from the knowledge of the ancient Greeks upon this particular subject until about the middle of the seventeenth century. The discovery of the circulation of the blood by William Harvey, and the heated discussions which consequently arose, stimulated investigation, and the importance of anatomy was first recognized. Its study was then entered upon in a practical way, by dissections and post mortem examinations. It was then that the nodules were first discovered in the lungs, which were afterwards described and named tubercles. The relation between these and pulmonary consumption was first pointed out by Sylvius, who died in 1672. He is better

known as the man after whom a certain fissure is named. He considered the tubercles which he found in the lungs to be enlarged lymph glands, analogous to scrofulous growths, and credited both to hereditary predisposition. This theory was widely accepted and received general credence, until a time within the memory of some here present.

About 1869 Morton taught that the tubercle was a necessary antecedent of the ulcerative process in the lungs. The glandular nature of the disease, as taught by Sylvius, was accepted by the majority of the teachers of the day, but disputed by Morgagni, and denied later by Reid and Baille. No medical or other scientific discovery or advancement has ever been made that has not had its opponents, and it is no part of the purpose of this essay to enter into any of these discussions.,

The first to describe miliary tubercles was Magnetus. This was in the year 1700, but the discovery was soon forgotten and lapsed into oblivion, until rediscovered by Stark, 1685. Bayle (1774-1816) was the first who based his researches upon the tubercles themselves and observed the changes from solid condition to caseation and softening. He described six forms of phthisis—tubercular, granular, melanotic, ulcerative and cancerous.

Important advancement in the knowledge of pulmonary diseases was made through the invention of the art of percussion by Ambrugger, who was born in 1722 and died in 1809; and greater still by the invention of the stethescope in 1815.

The inventor of this instrument, Laennec, was born in 1781, became a field surgeon in the French army soon after the Reign of Terror, and died four years after the death of the great Napoleon. He, therefore, lived through the period of all his wars, and amidst all the splendors of the first empire. His first stethoscope was a cylindrical roll of paper. His work on auscultation was published in 1819. Dr. Roswell Park says, in his history of medicine, that Laennec had but slight appreciation of his services to medicine, but prided himself on his skill in horsemanship. He died of tuberculosis in 1826.

Laennec eliminated from the classification of Bayle his gangrenous and cancerous forms, as not belonging to tubercular diseases. Also his calcareous and melanotic forms as not belonging to phthisis in the proper sense, and then united into one group

his tubercular and granular forms, thus greatly simplifying the classification. Every case of phthisis, according to him, develops from tubercles, and phthisis and tuberculosis are therefore identical, and the tubercle a fortuitous product—a neoplasm. Both Bayle and Laennec excluded inflammation as a cause of phthisis.

In the generation succeeding the death of the latter came Broussais, Rokitansky and Virchow, but they contributed little to the definite knowledge of tuberculosis. Little advance from Laennec'c teaching was made for many years, as he had carried it as far as could be expected from purely anatomical observations. It is possible that in his death he contributed more to the advancement of this knowledge than he did in his life, notwithstanding the great importance of his services. He cut himself while performing an autopsy on a phthisical cadaver, and soon thereafter developed symptoms of phthisis. As already stated, he died of it in 1826. This tragic event probably contributed to the ushering in of the period of experimental investigation, which began soon after. The first attempts to produce the disease by artificial infection were failures, but in 1843 Klencke announced that he injected tubercle cells from miliary tubercles into the jugular veins of rabbits, and autopsies made on these animals six months later revealed widespread tuberculosis of both liver and lungs. It is said that he did not fully appreciate the significance of his discovery. At any rate it was soon forgotten and did not influence either the prevailing theories of the nature of the disease or its treatment.

A very different result followed when the same effects were noted in the experiments of Villemin, which were published at the close of 1865. He inoculated rabbits with matter taken from the gray and yellow tubercles of pthisical individuals, by subcutaneous injection behind the ears, and found that they regularly developed tubercles in the lungs; while those which were inoculated with pus, or not inoculated at all, showed no trace of tuberculosis. He, therefore, concluded that phthisis is a specific disease and is produced by an inoculable agent.

The publication of these results produced quite a commotion in the medical world at that time. In spite of repeated corroboration, the facts proven by these researches did not receive general recognition, because other experimenters claimd that they had

also produced tuberculosis in animals by the injection of non-tuberculous matter, such as pus or particles of sponge. Further trials, however, by more careful observers, proved that these results were attributable to accidental infection, the experiments being carelessly and improperly done.

And so, gradually, it became the opinion of the majority that tuberculosis is transmissible and can be produced by the inoculation of a healthy person with tuberculous material. This brings us to the place in this history where it should be recorded that the infectious nature of the disease seemed to be demonstrated by repeated experiments, and this seems to be the best place to say that this theory had been held by the most careful and painstaking clinicians, during all the centuries, even back to the Golden Age of Pericles. Many names are mentioned of distinguished observers who held this view. Let it suffice to mention only a few: Galen, Avicenna, Morton, Valsalva, Morgagni; the last-named refused to conduct autopsies upon consumptives on account of the danger of infection. Benjamin Rush, the chief medical officer in the Continental Army during the American Revolution, believed in the infectious nature of this disease. All of these, and many others who might be named, physicians of every nation, and reaching back through the centuries to the time of Aristotle, believed the theory of the infectious nature of consumption, and, as Huber remarks, "they can not be accused of being stricken by the modern terror of baccilli." At no time, for many centuries, did the importance of contagion or infection in this disease escape the notice of the most celebrated physicians, and they were brought to this recognition by their own clinical experience.

In some countries laws were enacted in harmony with these views. One hundred and twenty-five years ago, in 1782, this edict was issued at Naples:

"The Deputies in this Capital, and the Governors of the Provinces should, immediately after the burial of a phthisical patient, be sure to have his rooms cleansed, the floors, wainscoting and ceiling renewed, the wooden doors and windows scrubbed and cleansed, and fresh plants introduced, in order that the corrupt and infectious atmosphere may not be communicated to persons who live near."

And also this:

"The Governors and Directors of the Hospital are ordered to keep apart the clothes and linen for the use of persons infected with this disease, that they shall be burnt, even in cases of cure."

Those who opposed the officials in doing this were punished by a fine of three hundred ducats and imprisonment, not exceeding three years.

In Spain and Portugal laws were enacted providing for the disinfection of clothes and beds of consumptives after their death.

In 1803 Chateaubriand wrote from Rome to a friend of the death of Madame de Beaumont: "I am in great difficulty; I had hoped to get two thousand crowns for my carriages, but, by a law of the time of the Goths, phthisis is declared in Rome a contagious disease, and as Madame de Beaumont drove two or three times in my carriages, nobody is willing to buy them."

The question of the infectiousness of tuberculosis having been settled by satisfactory demonstration, the attention of investigators was next turned to the nature and qualities of the agent through or by which it was communicated. Eeverything seemed to indicate that there is a living germ which entered the body and proliferated therein. Klebs, in 1877, and later Toussaint, each thought he had discovered the virus, having produced tuberculosis by inoculation, but, as with some of their predecessors, their experiments were faulty and they, therefore, missed the discovery of the real agent in the disease. But the time for the solution of the problem was at hand, and toward the end of the year 1881 Dr. Robert Koch of Berlin announced that he had discovered the germ for which the world had been seeking, and after a few months of further experiment the demonstration was published in 1882. The publication of his discovery is well remembered by the older members of this society. The keystone of the demonstration was the inoculation test, in which, not the mixed products of the disease but pure cultures of the bacilli, were used. The injection of these repeatedly produced typical tuberculosis in guinea pigs, rabbits and cats. The bacillus is a fungus, of the class of vegetable micro-organisms, a slender, straight or slightly curved, rod-shaped body, one ten-thousandth of an inch long and one fifty-thousandth of an inch broad. How it enters the human body, the methods of its proliferation, and the patho-

logical changes which it produces, belong to the domain of the essayist on pathology.

For a quarter of a century the question of the nature of tuberculosis has been considered settled by the great majority of the profession, and it is now classified among the infectious diseases. The tubercle bacilli are recognized as its sole cause, and this is all that need be said upon its etiology. Its history is ended, unless we enter upon a discussion of the attempts to limit or prevent its ravages, and this properly comes under the head of treatment. No great advance has been made since the discovery of the germ, and the hopes that were engendered by its discovery have not been realized. One hundred millions more of human beings have since fallen victims to its destructive power. After twenty-five years we are still at the mercy of our relentless foe. But there is a rift in the clouds, and with so much of the intellectual force of the profession directed against the foe, we confidently hope for a final victory.

PROPHYLAXIS AND TREATMENT OF TUBERCULOSIS.

BY AMOS CARTER, M. D., PLAINFIELD.

The fact that tuberculosis is a house disease gives us the key that, if used, will unlock the door to its prevention. Since climate has to do with our maintenance of heat in our homes, science must come to our aid and teach us how to heat and ventilate sufficiently to avoid sustaining hotbeds for the growth of tubercular and other germs inimical to health. We have seemed to build houses with a view to shutting in heat and shutting out cold, and have incidentally shut in foul air and shut out pure air. Sun light and pure air are the most potent factors at our command for destroying disease germs, and we must build with the end in veiw of admitting both freely to our homes, business houses, factories and mills. Concerning ourselves particularly with the tubercle bacilli, it is clearly demonstrated that they live a long time in moisture, and as clearly that sun light and pure air destroy them quickly. The primary essential in the prevention of any and all germ diseases is a perfect physical condition of the individual. It seems to be a well-established fact that there must be a weakened avenue, and it so open that phagocytes can not be sent in sufficient numbers to combat successfully with the invading microscopical enemy, and an entrance and establishment of pathological conditions are effected. In sanitary science lies the hope of eradicating disease. How to live is the query to be answered in dealing with the prevention of all disease. Germany has answered fully as to the prevention of smallpox by a compulsory vaccination law and its efficient execution. There is not, and has not been for years, a single case of the disease in all the German Empire.

That tuberculosis is communicable and that it does not occur sporadically is amply proven, if true, that for nine hundred and thirty-four years there was not a single case among quite a numerous population of Iceland, and that an immigrant brought it to the inhabitants; and that it has remained as a permanent

resident further strengthens the fact. Man is so made that he accommodates himself to unsanitary and unnatural surroundings. Civilization, with unscientific and artificial conditions, has made it possible for disease to be cherished and nurtured until it has been accepted as part of the curse declared upon man when he was ousted from Eden. Since we are assured that prior to the fall of man he lived in natural surroundings, art not having entered his realm, he also lived in perfect health, and knew no disease. We are also led to the conclusion that Adam wore no clothes, and there is no evidence that he had a dwelling house. This opens a field for thought, at least, that man may have departed from his natural environment into an artificial surrounding, fraught with danger.

There is an erroneous idea, very prevalent, that night air is injurious, and must be let into a residence very sparingly, if at all, and instead of planning to get all of it possible, it seems to be the rule to keep it all out. The real fact is, night air in cities is purer than day air, while in the country it is just as pure. Then, again, we are entirely at sea as to Eve's cook book. Nothing is said of whose make of cook stove she used. "Sunny Jim" had not made his appearance; but we may rest assured that the question of diet is a serious one. Drs. Wiley, Hurty and others of scientific bent are on the right track and may yet be of untold benefit in discoveries leading to correct living. I believe it to be a much higher and more important mission to educate and prevent disease than to foster its causes and study wholly measures for relief and cure.

Laws controlling marriage are being enacted in different states, and Indiana is not behind in this line. Our laws prohibit the matrimonial alliance of persons affected with infectious or contagious diseases. Tuberculosis may possibly be transmitted to the child from the parent, but not often so. The child is much more liable to contract it after birth. Tubercular baccilli are undoubtedly carried in the air from dried sputum, which might be controlled entirely if all sputum were destroyed in the moist state. Strenuous laws governing this matter would not be out of place, as they would be educational and of untold value.

In dealing with tubercular patients and their families in recent years I note a greater willingness among them to make energetic

endeavor to prevent a spread of the disease and a much less tendency toward the employment of "cure all" remedies. The successful treatment of the disease depends so largely on early diagnosis of it that this feature can not be too strongly emphasized, and I believe it attacks small eaters more frequently and with more fatal results than otherwise. When we are consulted by a patient with stomach trouble, especially one who complains of having to be very restricted in diet, and with an uncertain and capricious appetite, we should take warning and recognize these things as "danger signals," and either apprehend or exclude tubercular trouble. I mention this feature of the disease especially as it has to do with carrying out our treatment.

I believe fully that the rigid adoption and vigorous prosecution of sanitarium methods are essential to a successful issue. First, out-door life. Second, a generous, selected diet. Third, special care of the patient, as to rest, bathing and observance of rigid hygienic laws. The patient should be outdoors for at least ten hours daily—a goodly portion of this time in the sunshine, with the head at all times protected from the direct rays of the sun. At night he should sleep in a tent, with side walls so arranged as to admit fresh air in unrestricted amount. During rainy or exceptionally inclement weather he can be placed on a protected porch or stay in his tent with one or more side walls raised. Clothing should be of flannel or woolen in winter with blankets and fur wraps sufficient to maintain the outdoor life, the same as in summer. Of course, in winter meals can be taken in reasonably warm quarters, to warrant an enjoyable repast. This outdoor life increases and sustains an appetite to a degree that surprises even the patient himself. The diet must be generous. All fresh fruits should be furnished. Baked apples and oranges are especially adapted for the morning meal. Overfeeding can be readily detected; if the urine is examined and contains over 900 grains of solid matter daily the diet is too heavy, and must be reduced. Eggs are given, especially the whites, from six to twenty-four daily, served raw, with a little lemon juice, or, what is endured longer and with more zest, grape juice. The yolks and whites may be given together, if well borne by the patient, and if so borne may be given in the form of omelet, poached or boiled. Twice cooked meats should be avoided. Pork

unallowable. Soups of all kinds are recommended. Scraped beef (raw) for those with delicate digestion—rare beef steak and beef stewed or boiled is all right. Fresh fish broiled, boiled or baked; oysters, preferably raw, with the hard portion removed, or stewed, roasted or broiled. Cereals, oatmeal, wheaten grits, corn meal mush, rice and milk are the most suitable forms. All easily digested vegetables should be eaten, stewed and cooked with as little water as possible to avoid washing out natural salts. Wheat or rye bread, or mixtures of both, and zwieback are especially useful. Avoid all hot bread, pastry and cakes. If fats can be taken, digested and assimilated the prognosis is always more favorable. They must not be forced. They are best given in the form of cream, butter, yolks of eggs, crisp fat bacon and olive oil. If there is any tendency to diarrhoea, fats must be used with great caution. Food should be administered with the most punctual regularity and given by the clock. A preliminary to breakfast should be the whites of at least one or two eggs, and the yolks may be taken at the same time if borne well. Three solid meals daily are necessary at 6 or 7 a. m., 12 m. and 6 p. m., with eggs (raw), milk, nuts, graham gems or crackers at 9 a. m., 3 p. m. and at bedtime. If a patient is at all delicate the regular meals and lunches should be carried to him wherever he may be, but if he is stronger and has a reasonably good appetite he should walk to his meals and lunches. If the patient is febrile, with a temperature above 99.5, he should be put to bed and so remain until the temperature gets down to normal and remains so. This plan, faithfully carried out, will invariably reduce the temperature and guarantee a better appetite, more vigorous digestive and assimilative powers. Even advanced cases will be more comfortable and live longer if treated as above.

Bathing at least twice a week is a potent element in the cure. Bathing the chest on rising in the morning is a great help. This may be done at first with warm, then tepid, gradually adopting sponging of the chest with cool water on rising after the night's rest. An inviolable rule should be for the patient to lie down and rest, and if possible sleep or doze for at least one hour after each meal when solid food is taken; that is, three times daily. Exercise is to be taken strictly as the case may require or demand, its effect being watched and its amount graduated accord-

ingly. The patient should experience a tired sensation, but never fatigue. If exercise be allowed to too great extent a rise in temperature will be observed, with digestive disturbance, a very untoward result. It is remarkable how some seemingly slight departure from strict rules will cloud the prospects of a flattering and hopeful outcome. Discipline must be enforced with a rigidity that is really as yet not recognized very fully in many other diseases. Indulgence in business and social exactions must be forbidden. Light reading and cheerful conversation, with musical enjoyments, are beneficial. Buggy riding, unless apparently harmful to the individual case, is all right. Patients treated at home are of course not subject to nostalgia, which is certainly a bane in sanitariums, and unfortunately a serious barrier to success in many cases.

Tents or dwellings where patients are treated should be so located that no shade from trees or any other objects may fall upon them during any portion of the day; and may this not be true of any abode of the well as much so as of the sick? The patient should have a dressing room adjacent to his tent or room that can be heated when necessary sufficiently for bathing and dressing purposes, or the tent may have a stove in it, whence warmth can be obtained by lowering the side walls. Some heat tents with coal oil stoves, but this is not a good method, since one such stove uses oxygen equivalent to supply seven grown persons. My experience and observation is that air-tight wood stoves are quite successful in this part of the country, and I do not believe there is any better place in the world for the treatment of tubercular patients who contract the disease in this region. Experience has proven and fully established the fact that it is cruel to send patients to new and strange places to get climatic advantages, especially unless amply supplied with funds and an assurance that disciplinary measures will be readily adopted and carried out conscientiously; and this is next to impossible, because a patient will not discipline himself.

As to medical treatment, there is no specific. There is no prescribed line of treatment. Each case is a special in itself. If digestion is carried on satisfactorily, sufficient food taken, the cough not overtroublesome, there is no demand for any medicine. Any disturbance of the bowels should be corrected. As a rule

I think these patients are not inclined to constipation, and with a properly outlined diet there is usually no necessity for any remedies to control the action of either stomach or bowels. If sufficient food is taken and digested no medicine is necessary. If the cough is troublesome and disturbing, codeine is probably the best remedy at hand to control it, and I have been very successful with it, and have not found its continuance necessary in any case. Of course advanced and hopeless cases require medicines, most of them to control cough and many to aid digestion. In the cases in which I have seemingly succeeded I have used no medicines except at the beginning of treatment. In two cases I gave codeine to control cough, and in one calasaya, iron and strychnia to strengthen and stimulate the appetite.

In the care of the room of a patient all sputum should be caught on paper napkins or toilet paper, placed in a common paper bag and burned while moist. All dejecta should be disinfected, burned or destroyed in some efficient way. The bedding should be exposed to the sun's direct rays daily for some hours. The floor of the tent should be cleaned carefully with carbolized water at least once each day, all furniture dusted and everything kept in strict sanitary condition.

In prevention the first essential is a healthy body with no tubercular surroundings. In treatment the most essential thing is an early diagnosis. The next essential is the adoption of rigid treatment. If the development of the disease is not beyond incipiency the greatest assurance may be given of a successful recovery.

HOME TREATMENT OF TUBERCULOSIS.

BY F. A. TUCKER, M. D., OF NOBLESVILLE, IND.

Treatment of tuberculosis is of very recent birth. To do something to make a tuberculous subject get well, actually to contribute something towards his recovery by any other method than change of climate, is a new concept, so new that very few as yet grasp it. In the not very distant past there was but one course open to a tuberculous subject, namely, to change climates. This was called climatic treatment; and climatic treatment of tuberculosis in the sense here given has existed since the days of Hippocrates, and during all this time held out hope but did not remove the stigma of incurability from the disease.

The idea of the curability came with the new treatment of the disease, and since the new treatment of tuberculosis has come into existence we speak of two kinds of treatment—climatic treatment and home treatment. It is of the home treatment that I will consider today, and I do this in a spirit of fairness, inasmuch as in the old sense it was not a treatment at all.

Home treatment of tuberculosis is treatment of the disease in the home climate where the disease is contracted, also in the private home of the individual patient, disregarding climate altogether as a curative factor, but by trying to restore the patient to health with as little interference with home life as possible, depending upon science in its broadest sense exclusive of climate.

Home treatment is entirely devoid of the element of climate, is free from the worries caused by absence from home, is much less expensive and does not break up business arrangements and home life. What does absence mean in the treatment of tuberculosis? Is it an asset or liability for recovery? Mental attitude undoubtedly plays a part in the treatment of tuberculosis; the best asset we have for recovery is good physiological metabolism. Just in proportion as a tuberculous subject becomes physiologically normal are his chances for recovery increased. He must eat

well, sleep well, digest well, oxidize well and eliminate well; whatever interferes with any of these functions inhibits recovery. Homesickness interferes with some if not all of these functions to a greater or less extent, and homesickness occurs in most people who go away from home. Besides homesickness we are to reckon with fatigue of travel, life in a boarding house, hotel or sanatorium and the many difficulties of acclimatization as interferences with normal physiological action.

Expense is an item to be carefully considered in the treatment of tuberculosis, as it is often the ultimate determining factor in recovery. Tuberculosis is a long drawn out disease even when the outcome is favorable, and whatever treatment is followed must be a long one. For the average individual the expense of climatic treatment is prohibitive, and even for the well-to-do it is often embarrassing. Interference with business is also a liability in the account of climatic treatment of tuberculosis which must not be lost sight of. A man will give anything to save his life or that of any member of his family, and when told by his physician that he must sacrifice his business and go away he usually does so unhesitatingly and without due regard for the future. Pulling one's self up by the roots, so to speak, and transplanting one's self into a new soil is not an easy matter, and is often accompanied by disappointments and heartaches of many kinds. The treatment of tuberculosis is now followed by the most advanced workers in this field as a pretty exact science, based upon principles well understood and correctly applied. These principles are: The most successful treatment depends upon an early diagnosis, before there is dissolution of lung tissue, and that tuberculosis is a parasitic disease, and that cures take place through development of resistive and destructive forces within the body, and through the introduction of such forces from without the body. In other words, the cure of tuberculosis depends upon the natural resources and resistance of the individual, reinforced by extraneous forces properly and timely applied, and our capacity to cure the disease depends upon our skillful regulation of life so as to make available the natural resources and resistance and our timely application of artificial assistance.

Based upon the principles just laid down, the modern home treatment of tuberculosis consists of: First, a careful selection

of diet; second, the regulation of exercise, rest and the mode of life; third, medication; fourth, artificial immunization. In these items we have a powerful armamentarium for the treatment of tuberculosis at home, and by their proper use we can cure almost every case of incipient tuberculosis and a very large percentage of even advanced cases. Every one of these items I consider of importance, and should be available for every patient if all is to be done for him which modern science enables one to do. As already said, we must keep our natural resistance up to or above normal. The word resistance is a term which covers our ignorance; we don't know fully what it is or how it acts, but we do know how we can acquire it and how it may be lost, and by far the most frequent way by which our resistance is lowered is by breathing foul air, which we find in poorly ventilated and overcrowded school rooms, closed bedrooms, offices, court rooms and stores, always in houses, and we must ever be on our guard against impure air and unwholesome surroundings.

But to return to my arbitrary terms, as enumerated above, I will try and consider them in order. First—A careful selection of diet. Indeed the diet of a tuberculous patient is a rather vexed question, not alone as to the quality but the quantity of food. The rational dieting consists not in the indiscriminate stuffing nor in indiscriminate lessening of the food, but in furnishing a diet rich in the appropriate albumenous constituents, such as meats, meat juices, fats, butter, cream, honey, vegetables, milk, eggs, etc. The patient should eat slightly more than an average meal of meats, vegetables, cereals, etc., and take at least two quarts of milk and six eggs between meals each day where they can digest it properly. Overfeeding and stuffing should be avoided. Some can not take or digest milk or eggs at all; in such a case you must find a suitable substitute. The details must be decided upon in individual cases. In general terms it should be such as will give the largest amount of nutrition with the smallest quantity and least labor for the alimentary tract. No fixed or fast rules can be laid down as to the amount any one shall eat, but you must be governed by their symptoms and indications of improvement or any indigestion from lack of assimilating powers. The physician and patient must confer often as to the condition of digestion. We must ever remember the ten-

dency of tuberculosis is to progressive loss of weight; consequently if we are to arrest this tendency to emaciation and at the same time to improve the quality of the blood and build up tissue around about the tuberculous foci we must order a dieting containing more nourishment than would be required by a healthy person under similar circumstances. Second—The regulation of exercise, rest and the mode of life in the home. After the physician has established an early diagnosis recognizing the gravity of the disease he should begin by cultivating a perfect confidence in himself by the patient and his family. The patient must be obedient to his physician in every detail of the treatment enjoined upon him; he must be confident of his recovery and optimistic at all times; he must understand that his improvement and final recovery will depend largely upon his own conduct and the precision with which he obeys the orders and rules from his physician and nurse. The physician's words and rules must be law in the home, as they are in the sanatorium. Persistence and patience on the part of the physician and patient alike. As benefits to be noted is usually a matter of months, complete arrests a matter of years, absolute cure a matter of many years, hence we must have patience and fortitude in being willing to submit to the slow process of getting well.

Sunshine by day, fresh air by day and night, is a part of the regulation of life, and a principle of the treatment that the patient at every possible moment breathe fresh air all the time and be in the sunshine at every opportunity. Among the many blessings which pure air confers are the rest and repose it induces and the ravenous appetite it occasions, which makes possible the abundant feeding essential to recovery. Pure air and the blessed sunshine are death to the tubercle bacilli. The pure air, tempered by a warm sun and inhaled in abundance both by day and night, stimulates the appetite, improves the digestion, suppresses the paroxysms of coughing, aids expectoration and invites a calm, restful sleep which gives strength.

Absolute rest, particularly when there is a temperature or subnormal temperature, is so essential that it becomes a part of the daily regulation as important as the diet. Rest is a very essential feature; various conditions, such as hemorrhage, high fever, debility, nervousness, etc., indicate complete rest in a recumbent

position. It is a good plan for patients to rest at least an hour before and an hour after each meal. Regulation exercise is an important factor in the treatment of tuberculosis, and should be indulged in and allowed only upon the advice of the physician, who should carefully note the effect upon the respiration and circulation, and impose rest accordingly.

Third—Medication. As regards the home treatment of tuberculosis in its relation to medicines, will say, let no patient use any medicine without his physician's directions. I regret very much to say that there is at present no specific that will cure consumption. One of the saddest pages in medical history is that upon which is written the deaths of consumptives who need not have died, but who became the willing victims of the so-called sure cures.

The advocacy of some specific medication or a long list of drugs to pour down the throats of your confiding patients I can not support, as modern medicine has passed beyond or rather is rapidly passing out of the age of expectorants, tonics and even cod liver oil into that of hygiene and diet. Yet drug therapy is a part of the subject of the therapy of tuberculosis that can not be passed by in silence, because it forms the sole means of management in the hands of a very large percentage of the medical profession. I consider it not for the purpose of its endorsement but to condemn it, in so far as results speak, as compared with the modern hygienic and dietetic treatment of today.

The stomach is the consumptive's fortress. Destroy his digestion and he is a lost man. What, therefore, can be more pernicious than the administration of cough syrups, tonics, compounds of creosote or guiacol, etc., with which the market abounds and the newspapers advertise for the sole purpose of gaining a tainted dollar from some poor, ignorant sufferer. They are all prescribed with the hope of improving the appetite and aiding digestion, hoping thereby to increase nutrition, but instead of accomplishing the end desired, in the majority of cases they destroy what little appetite is left and derange the digestion.

I feel that I must consider some of the most popular remedies in use in the treatment of tuberculosis.

Take first the use of creosote and its derivatives. It seems to me the history of the use of this remedy forms one of the sad

chapters in medical literature. They are given mostly now to stimulate the appetite and aid digestion, and by some claimed to have a germicidal effect upon the blood. Possibly some have been benefited by these remedies in large doses, but what of the thousands of cases of persons who have tried in vain hope to take the creosote preparations and been forced to desist. Cod liver oil is another relic of bygone time when faith was pinned to its use. Its employment was based on the need of the consumptive for fat in an easily digested form, which is very true, but the class of cases where this oil is suitable is the chronic cases without fever and digestive weakness. It should not be prescribed hit or miss, but with an understanding of its indications. It should never be persevered with if it deranges digestion, since its place can be supplied to advantage by cream, butter and other forms of fat. The hypophosphites are another class of remedies much used, and with much benefit in selected cases of the chronic variety where tonics seem indicated. If used they should be free from sugars for fear of deranging the stomach. I think, however, they then can not replace foods or fresh air.

The malt extracts are still another class of remedies much used, alone or in compounds, because of their high nutrient value, and often prove beneficial in selected chronic cases. Other tonics, as arsenic, iron, strychnine, quinine, calisaya bark and the like, may and should be prescribed in chronic cases or acute cases with much anaemia, and are a great aid to life in the open air and sunshine, exercises and food in the building up of the blood and tissues of the body. In fact, the routine and persistent administration of these or any other drugs is what is especially to be deplored, and not their occasional and intelligent use.

Fourth—Artificial immunization. Happily the day is not far away when we will be able to provide and maintain immunization to tuberculosis by an antitoxin or vaccine based upon scientific principles and properly carried out. We will have to consider the mixed infections and deal with the different germs or bacilli separately or collectively with a vaccine or serum which will give our patient the resistance and immunity desired. The pneumococcus, streptococcus, staphylococcus and the tubercle bacilli each afford a field large enough to require the time of many investigators, but I firmly believe the best results are to be worked out

on the lines of producing a vaccine of various kinds from one's own germs secreted by him, thereby giving more rapid and more permanent immunity to further progress. Our serums as we have them today are not yet perfected to that state to give confidence in their indiscriminate use.

Certain other things are absolutely indispensable besides the qualities of climate, medicines, health resorts, etc. These are good home accommodations and the attendance of skilled physicians and attendants in the management of tuberculosis. Without these the home treatment will avail nothing. Nothing is a greater mistake in most instances than for tuberculosis patients to place themselves in the hands of unskilled and unscientific men in the treatment of tuberculosis. My personal opinion with reference to change of climate is that a person with incipient tuberculosis of the lungs, particularly if limited in extent, can be ordinarily treated to better advantage at home by a skilled and scientific physician who understands the subject.

OUTDOOR TREATMENT OF TUBERCULOSIS.

BY J. C. BLOSSOM, M. D., OF MT. SUMMIT, IND.

A specific in the treatment of tuberculosis has long been sought, and prominent in the history of medicine is the effort to combat tuberculosis by therapeutic means, and even more prominent is the failure of its accomplishment. Experiments and observations in the outdoor life have been conducted both in this country and in Germany during the last thirty years and our present system of treatment developed thereby. Trudeau started it in the mountains, Osler indorsed the treatment after extensive experiments in his hospital, dozens of others took it up, states established hospitals for the accommodation of their poor and private enterprise for those who were able to pay, and the movement was fully launched.

The elements of this treatment are pure air, diet and a careful supervision of the patient's habits of life. These elements we can have in Indiana as well as elsewhere. The necessity of an abundance of uncontaminated air has been presented before this society often, and I shall say that at the Indiana outdoor colony we usually find that within the first week or two our patients are breathing deeper, eating and sleeping better, gaining weight and taking a more optimistic view of life. These results can be ascribed to no other cause than that they breathe pure, fresh air twenty-four hours every day.

An abundance of fresh air is to be secured in a variety of ways as it seems best to each of the parties who have charge of the matter. Many institutions use tents, some use wooden shacks and a few the more substantial buildings that a liberal financial support makes possible. Advantages and disadvantages could be found with any means one would provide, but I think that cost and utility considered, a properly constructed wall tent gives as good satisfaction as anything we can use, for the tent is only designed for occupancy during the night and very bad weather, as the patient is expected to remain out of doors at least ten hours every day, and some of them stay out much longer.

The treatment of tuberculosis is a great field, and in it are almost unlimited opportunities. Outside the realms of surgery I know of no more inviting prospect than the combat of tuberculosis, provided the cases can be seen early, but, like surgery, not all are qualified to actively engage in the work nor are all cases within the province of its treatment. Like surgery also, we must look to the family physician for an early recognition of the disease and a recommendation as to the methods of treatment open to the person thus afflicted. This is one of the most important tasks that confront us. It is here that we have the best opportunity to administer good advice, and here, too, when the physician first mentions his suspicions, that the case is most apt to get away from us and fall into the hands of some one who will make a pleasanter diagnosis. Yet our duty is plain. They must know the truth if we are going to be able to help them, and no man has a right to hold his peace in the presence of this infection.

The diagnosis of these cases is not easy, and here is the family physician's opportunity to do for his patient what no one else can do—make an early discovery and place the pateint in a position to have a chance for his life. Many hours of study should be devoted to a case before a conclusion should be reached, for in so important a matter as this no time or pains should be spared. Reports from a leading outdoor colony for the last year show that of early cases 46 per cent. were apparently cured and in 54 per cent. the disease was arrested. Of advanced cases none were reported cured, in 25 per cent. the disease was arrested, 50 per cent. were improved and 25 per cent. were not improved. Of far advanced cases none were cured, none arrested, 50 per cent. were improved and 50 per cent. were unimproved. These figures emphasize more forcibly than anything that I could say the importance of an early diagnosis and the institution of treatment before the vital forces of the patient are too much impaired. The fight against tuberculosis will have been half won when an early diagnosis can be made with certainty and nonsuppurative cases placed under proper conditions, and will be the other half won when the public is taught that a diagnosis of tuberculosis is not a death warrant, but that suitable cases yield good results.

The diet is one of the chief concerns of the physician, and I should say that you may expect about as many kinds of trouble

as you have patients. Of course we have to set a table of such things as would be suitable for all patients, and some will eat abundantly of one thing, while others will eat something else. In theory it is very easy to make a diet list, but after one is made, unfortunately our patients usually want something different, and one has to vary the menu every day so that they will not tire of the food and become indifferent as to whether they eat at all or not. While we should strive to feed them the things best suited to their cases, we must not press undesirable articles upon them for fear of interfering with their eating anything. Every appeal should be made to encourage the patient to eat. An attractive dining service is of the utmost importance; not necessarily elaborate, but carefully and tastefully served. This with good cooking, and these supplemented by pleasant companionship and conversation, will hardly render necessary the injunction to eat whether the appetite demands it or not.

We serve three full meals and two lunches each day. Our lunches at 10 and 3 o'clock are practically the same every time, consisting of milk, eggs, nuts and fruit. The meals are more elaborate and are not duplicated in any one week, though they have the same general points of likeness. People in general have the idea that milk and eggs are the principal items of diet. We read in the daily press of people eating dozens of eggs and drinking great quantities of milk. This is a mistaken idea, and the consumption of milk and eggs can be overdone the same as any other item of diet. Five eggs and from six to twelve glasses of milk we consider quite enough for any one, and we would rather that our patients sought the additional amount of albumen needed among the vegetables. Our object is to make a dietary containing the elements of nutrition in due proportion, selected from such articles as are most agreeable to the patient. A brief view of the relation between waste and repair will help us to draw some practical lessons.

Urea is the end product of the oxidation of albumen in the body, and its excretion is a reasonably accurate measure of the albumen consumed and also of the force available. Its rise and fall registers the condition of nutrition, strength and endurance of the animal body. It is easily shown that in sickness and health the excretion of urea rises and falls in proportion to the utiliza-

tion of albumenous food and the amount of exercise. If more albumen is taken than is consumed then some will be stored up in the tissues; if less is taken, then some must be extracted from the store. In starvation there is a constant daily diminution of body weight which can be determined by the excretion of urea quite as accurately as by the scales, and such loss is proportionate to the albumen consumed and the force produced. Of course when there are no more albumens left from which to draw, life must cease.

Sugars, fats and oils do to a certain extent affect the production of force from albumen, but such influence is always indirect, and as far as practical results are concerned may be disregarded.

Since three grains of albumen when oxidized will produce one grain of urea, and as most physiologists agree that there should be excreted about three grains of urea per pound of body weight each day, we can determine the amount of albumen necessary for any patient by multiplying his body weight by nine. Some variation in this rule will occur, depending upon mode of life, presence or absence of adipose tissue and like exceptional conditions. Thus we have solved the first problem of our feeding, but the next one is not so easy, either in theory or in practice, and when we attempt to supply the amount we have just found necessary in a form that will be acceptable to our patient's mental and physical condition we begin to understand what is meant by the old saying that we can lead a horse to the trough but we can not make him drink.

Say that our patient weighs 130 pounds. By multiplying by nine we have determined that he needs 1,170 grains, or 78 grms., of proteid food per day while at rest. Considering the relation between rest and activity we find that this same patient will require 115 grms. while engaged in very light exercise. He takes three meals and two lunches per day. Each meal represents three times as much as a lunch; then we can estimate that at each meal 31.5 grms. should be provided and at each lunch 10.5 grms. should be given. So we make a menu something like the following minimum:

A MEAL.			A LUNCH.		
Milk, 1 glass	8	grms.	Egg	7	grms.
Cream, 2 dr	.4	"	Milk	8	"
Egg	7	"	Nuts	0	"
Butter and bread	2	"	Fruit	0	"
Meat	14	"		15	"
	31.4	"			

The above meal and lunch represents much less than the average patient will take under ordinary circumstances, so we have a rather wide margin to enlarge upon in the case of the patient whose difficulty is a loss of appetite, but it will serve to show the outline of how these items are calculated. It can be increased or diminished as the desires or needs of the patient demand. Whatever is taken and assimilated above the actual needs of the body is stored up for future use and may be called out at some critical time when appetite or digestion fails temporarily. The milk, eggs and meat will not vary much from day to day as far as amount is concerned, but such methods of preparation should be employed as will stimulate the appetite as much as possible, with fruits and vegetables in their season; in fact, every item of service will be noted with greatest care that each meal may be an agreeable and a profitable one to the patient.

We have assumed so far that our patient has normal digestive and assimilative powers, so that all the food taken will be utilized in the economy, but in practice such a happy state of affairs is the exception rather than the rule, so that we must determine whether the individual is or is not normal in this respect. If 1,170 grains of albumen are consumed and all is appropriated and used in the production of force, then we would find in the urine one-third that number of grains of urea, or 390 grains. If we find it so we would then conclude that our patient had an excellent digestive system and on the present feeding would neither gain nor lose, so we would have to increase the ingestation of albumen if we expected the patient to gain in weight. But suppose that our patient is excreting only 200 grains of urea instead of 390 grains. We will conclude that either he is storing up in his tissues 190 grains per day or else he is not assimilating and oxidizing the amount he ought to do. Which? The scales will answer your question. If he is gaining in proportion to the

amount stored, the question is only one of pushing the amount of nourishment up to the limit of the digestion with a constantly increasing weight.

But if he is not gaining we are again at the parting of two ways, and we must determine which of them leads to the solution of our problem. Digestion may be at fault and we may have food passing through the alimentary canal as a total loss, or, since the food absorbed never becomes nourishment to the body until it meets the oxygen in the lungs, we may have food circulating in the blood and being eliminated without ever having been oxidized and made available for force. By a painstaking examination of the patient with this particular point in view we are usually able to determine which condition we have to deal with, and in most cases you will be able to tell at once whether digestants and a change of diet is necessary or whether breathing exercises and more life out of doors will correct the difficulty.

The subject of diet is one that is given too little attention, and we too often tell our patients to eat plenty of nourishing food, and they comply by eating any and every thing that their fancy prompts, and end by disarranging their digestion until nothing is absorbed, their appetite fails and they are in a deplorable state indeed.

Realizing that the prognosis in any given case depends more upon the ability of the patient to absorb and oxidize food products than upon any other single item of treatment, I have endeavored to point out some of the difficulties and indicate the methods of their solution employed by me in the treatment of my patients.

The most important factor in the treatment of tuberculosis is constant, intelligent supervision. The supply of air and the details of diet may be perfect in every particular and yet the pateint die promptly enough unless his every act and function be supervised. Here the physician is most in evidence in this form of treatment. From the time that the patient comes under your care till he leaves he needs almost hourly guidance. Our first care is to provide for the proper collectoin and destruction of the sputum for the protection of the attendants and the patient, who might reinfect himself. Suitable sputum cups with paper refills are provided for use when about the tent, and paper nap-

kins are used when the patient is walking or not convenient to his cup. These napkins can be carried in the pocket, and when soiled are placed in paper sacks and burned, thus destroying the bacillus and preventing infection.

The utmost care must be exercised to prevent patients from swallowing their sputum and infecting the alimentary tract. One would think that once explaining the danger would be sufficient, but it is not not, and while a patient would hesitate to spit upon the ground where he would endanger others, he will, if his sputum cup is not convenient, serenely swallow a few million tubercle bacilli rather than to go to the trouble of going to his tent for his cup or interrupting the game he is playing. This matter is of such extreme importance that constant supervision is necessary to protect the patient from himself.

Most patients are anaemic and can stand much less cold than a well person, so that they are inclined to stay indoors too much. An attendant must wrap them up well with foot warmers and water bottles so that they will be comfortable, and urge them to stay out of doors, impressing them with the fact that every hour spent indoors is an hour lost.

Overindulgence in anything that pleases the patient is another of his dangers. If he is interested in cards, checkers or any game where one is quiet he is apt to stay indoors too much. If it is croquet or such outdoor game he may be on his feet more than is good for him. He may overeat or drink, or may walk too far for his strength, and it is here that the director has a great deal of trouble, for every one can make a good argument in favor of doing the thing that he wants to do, and judgment and firmness are necessary to prevent the undoing of weeks of gain. This spring two of my patients who were doing well and who were allowed one hour's walk each day decided to go to a sugar camp one and one-half miles away. They made the trip without my knowledge or consent, and when they returned they both had a rather sharp rise of temperature, a loss of appetite, and one of them was confined to his bed the next day. When asked about it they said that they did not think that it would hurt them, as they had walked that far the day before in another direction where the ground was level, and this time they did not consider the hills they had to climb till it was too late, so suffered the consequences of their indiscretion.

Visits and company are things that tax the diplomacy of the attendants. Cases that have a rise of temperature invariably show a higher temperature during the visits of their friends, and all who go home to spend a Sunday come back worse for it. While we like for our patients to enjoy themselves, we think that anything that keeps the patient indoors, as company usually does, should be discouraged.

The proper regulation of the exercise of the patient is one of the chief concerns of the director, for what we have gained from fresh air and a judicious diet may be quickly and effectually destroyed by injudicious exercise. After days and weeks of patient labor, having secured for the patient an equilibrium from the ravages of his disease and the repairative process has begun, an indiscretion in regard to the amount and kind of exercise often turns the tables against us. It is a common observation that tuberculous patients, especially when one is on the road to apparent recovery, are inclined to take too much exercise. While they are very sick one can quite reasonably say that they must be quiet, and they are willing to obey, both because they feel indisposed and because they feel that it is absolutely necessary, but as their strength increases they feel they are able to take more exercise and perhaps do some light work, and they often discover too late that their strength is only apparent. It is quite common for this class of cases to relapse and have a hemorrhage or a sharp rise of temperature after comparatively moderate exercise. Usually no exercise is allowed for the first week, then none if there is a rise of temperature or if the patient has lost weight. If after a week the conditions are favorable patients are allowed to exercise by walking from thirty to sixty minutes mornings and afternoons. If no untoward symptoms arise the length of time of exercise is increased gradually as the patient is able to stand it. If any rise of temperature results or any physical manifestations seem to indicate it the exercise is immediately curtailed, even to the extent of putting the patient to bed. Such vigorous measures are not often necessary, as rest in our reclining chairs usually is sufficient to restore the patient to a good condition.

These are a few of the difficulties to be met with in the management of tuberculous cases, and serve to show that the treatment is not easy of application.

I have had inquiries from physicians and laymen asking if I could supervise this treatment at the patient's home. The answer is obvious. Home treatment is within the province of the family physician, upon whom I have neither the right nor the inclination to infringe, and the results of such treatment would be so unsatisfactory to both the patient and myself that it would be useless to attempt it. For if when I have opportunity to see the patient several times a day I am scarcely able to keep him in the bounds of what he ought to do, what chance would there be for me to do so seeing him once a month or less often?

The only way that home treatment can in my judgment be accomplished with any promise of succes is for the patient to go to a sanitarium for a few months, where he will learn the routine and have the system of the treatment thoroughly taught him, and then let the family physician supervise him for the eighteen or twenty months yet that he needs to be under observation.

In pursuing this method of treatment we have secured very satisfactory results, our patients, almost without exception, gaining materially in weight, ranging from one and a half to six and a half pounds per week, with a total gain in some cases approximating twenty-five pounds. Temperatures have declined steadily, with a longer time of normal temperature from day to day until free of fever. Night sweats cease, cough and expectoration are relieved, the tubercle bacilli disappear, consolidation clears up, the lung tissue heals, the appetite and strength return, digestion and assimilation become more perfect, circulation is equalized and the patient regains a normal condition. With these results and the history of the movement before us we are inclined to pursue the treatment still further, and we are inclined to think that if physicians would encourage their patients to take a course in sanitarium treatment until the patient should become educated in the details and routine of the outdoor life they might then safely return to their homes and under the direction of their family physician continue the treatment until a permanent cure is effected, saving many valuable lives to the state and implanting in many communities apostles of health and right living, who would teach the people not only the technique of our treatment but scatter broadcast over the state those principles of prophylaxis that will ultimately make tuberculosis less prevalent than it is today.

REPORT ON TUBERCULOSIS.

BY THEODORE POTTER, M. D., OF INDIANAPOLIS, CHAIRMAN.

A review of the year's progress in tuberculosis leads us to give attention to a number of things which have been the subjects of special discussion. These may be enumerated under the following topics:

The institutional treatment.

Climatic treatment.

The tuberculin treatment.

The relationship of human and bovine tuberculosis.

The channels of infection.

The question of latent tuberculosis dating from childhood.

The sociological campaign against tuberculosis.

The progress of the public health measures with reference to tuberculosis.

The work of the Indiana state tuberculosis commission and the legislative action in Indiana.

THE SANATORIUM TREATMENT.

This plan of treating early tuberculosis continues to attract attention and win support. For probably most cases it remains the best plan and offers the largest promise of arresting the disease. Especially is it the best and most available plan for female patients, and this for personal and sociological reasons which suggest themselves.

Several problems press upon those who conduct sanatoriums. There is still the urgent question of diagnosis, still so often made so late, and the institution of early radical treatment. Only constant agitation, constant discussion and study in medical societies, and careful attention to the matter in the training of medical students, undergraduate and post-graduate, can correct this defect. Whether the patient is to be treated at home, at a health resort or in a sanatorium, good results are likely to be got in any

large per cent. of the cases only if such treatment is begun early. We must, therefore, keep alive and press upon ourselves the importance of recognizing the disease as early as possible. Another problem which vexes the sanatoriums is that of inducing the patient to remain long enough to gain radical benefit. Statistics show that a large proportion of the patients leave before their disease is really arrested, much less cured. For this there are several reasons. First, the expense; and hence the need for public institutions to treat the poor and those of limited means, and of private institutions with moderate charges for the great independent, self-reliant middle classes. Second, the exaggerated expectations which have been engendered in the public mind regarding the results of the institutional treatment. So freely and carelessly has the word cure been used that many persons have been led to believe that tuberculosis, even in somewhat advanced form, may be cured by a few months' stay in a sanatorium. Against this mistake the best clinicians and the thoughtful sanatorium physicians are earnestly protesting. The fact is that but few indeed come from the sanatoriums or from under any plan of treatment extending over such periods as three, six or even twelve months with their disease really cured. The best that is attained in the great majority of the favorable cases is an arrest or the so-called apparent cure. But the patient, deluded by the encouraging evidence of arrested activity and by the rapid gain in general health secured under the specially favorable conditions, thinks he is "about well" or "about cured," and prematurely terminates his treatment. Not a few of the more intelligent patients do carry out afterward the lessons learned; but many without such intelligent view of what the treatment really consists of think, to their own undoing, that they "can carry it out just as well at home," even without the aid of a physician. A few succeed; the majority partially or wholly fail. A third reason for the too brief stay of the patients is doubtless the somewhat dull routine and monotony of the sanatorium treatment. This is simply an evidence of human nature. The simple measures used grow old and commonplace, and the patient grows mentally if not physically stale. It is no easy task to successfully conduct a sanatorium for tuberculosis, and no greater mistake can be made than to suppose that any one having good in-

tentions and fair knowledge can do it. It takes something more than good intentions and knowledge to make a good institutional manager, just as it does to make a practically successful family physician or consultant. Tact, knowledge of human nature and the ability to deal with it, the faculty of making a sick man cheerful, contented and happy under adversity, of holding him up while holding him down, of directing and controlling the mental and moral as well as the physical needs, these are also requisites in one who would meet successfully the exacting scientific, social and moral responsibilities involved in the conduct of an institution for the protracted treatment of a chronic disease like tuberculosis. There is some danger that these things be overlooked in the present enthusiasm, and that harm be done the cause by the misleading idea that any one of good intentions who can use a stethoscope and microscope, and can provide a kitchen and a row of tents can successfully conduct a sanatorium for tuberculosis. But let us put a stumbling block in the way of no one who has the will and the heart to try it, only requiring that he be reasonably capable and experienced in practical medicine, honest and, as Osler says of such, personally worthy of the utmost professional confidence.

Still another problem which confronts the sanatoriums, and is in some instances enlisting their best efforts, is that involved in the after treatment of the patients. And this problem presses also upon the physician who by home treatment secures an arrest of the disease or whose patient returns from the institution similarly improved.

Since in the great majority the disease is by such systematic special treatment only arrested, the question comes, what shall the patient now do to confirm and continue this arrest or happily carry the healing process on to a real cure? For though the arrest of early cases is often comparatively easy and rapid under proper treatment, the real cure of pulmonary tuberculosis is usually a matter of years. The best sanatoriums are therefore trying to keep in touch with former patients, as the private physician does with his, having previously used every effort to so instruct, train and influence them that their future course will be guided thereby. And this the private physician must also do if he would succeed in fullest measure. For he who undertakes the

advising of young persons suffering from tuberculosis has in his hands literally their lives, their future and their fortunes.

CLIMATIC TREATMENT.

The question of special virtues in special climates, whether because of prejudice or of inherent importance, will not down. The revelation of what could be done under proper treatment and the outdoor life in any reasonably healthy place has thrown the climatic treatment into the background by demonstrating its relative unimportance in the cure, and especially in the arrest of tuberculosis. Hence the rapid and radical change of opinion upon this matter. No one nowadays who gives a second thought to his therapeutics sums up his advice to the patient in the time-honored injunction: "Get out of this climate at once; go west as soon as you can." But we are hardly warranted yet in subscribing to the other extreme doctrine that there is nothing in climate per se in the treatment of tuberculosis. The majority of experienced clinicians have not subscribed to that doctrine even under the influence of the sanatorium demonstrations and enthusiasm.

The older clinicians used to dilate with fervor upon the physiologic influence of altitude, of purity, dryness and rarity of air, and large amount and actinic effect of sunshine. Few who heard him will forget the eloquent and scholarly address of Whittaker at the Lafayette meeting upon "Climato-therapy in Phthisis." It is difficult to estimate any special virtue of such things in the healing of tuberculosis, but that they may have some special virtue is not beyond reason, and in the opinion of many not to be denied. Certain it is that it is more comfortable, more attractive and safer to take the outdoor rest cure during the heat of midsummer and the raw cold of late winter and early spring which prevails in many places, in the dry and sunshiny than in the moist and cloudy regions. At the recent meeting of the Climatological Association views were expressed upon the question of climate as an addition to other rational treatment which should make us careful of extreme opinions either way, and slow to wholly cast aside the older views.

THE TUBERCULIN TREATMENT.

Any one who has kept track of recent medical literature and medical discussion is aware that renewed attention has been given to the specific treatment by the various forms of tuberculin, and of late, chiefly under the influence of Wright and Douglass, of England, to the use of these agents under the guidance of the opsonic index.

At the recent meeting of the National Association for the Study and Prevention of Tuberculosis much attention and interest were given to this subject.

There is still much difference of opinion among the workers, most of the experienced clinical observers being conservative and cautious. There is apparently so little natural tendency to self-limitation and self-immunity in tuberculosis that there does not seem to be a bright prospect for great results along this line of specific therapy. Certain it is that at present it is not a treatment to be lightly undertaken under ordinary conditions, and a caution is necessary lest a wave of mere enthusiasm come over us and reckless trials of tuberculin treatment lead to harm. The subject of the opsonic index will be presented elsewhere during this meeting, and we may leave its more thorough consideration to those who will present papers upon it.

CHANNELS OF INFECTION.

The prevailing opinion has been, and this is still probably correct, that tuberculosis most frequently gains entrance to the body through inhalation, and that it enters the tissues chiefly through the respiratory tract. Recent investigations, however, have demonstrated that in animals the germs may be introduced at any point in the body, even at the root of the tail, and still find prompt lodgment in the lungs. Further, ingestion experiments have demonstrated the same thing. Work of this kind has thrown doubt upon the inhalation theory, and has given rise to the doctrine, now strongly advocated by some, that the digestive tract is the chief channel for entrance of tubercle germs, and that in many cases at least the microbes which are inhaled lodge upon the upper mucous membranes, are swallowed and are taken up from the digestive tract.

These new doctrines are not yet generally accepted by authorities. At the Washington meeting Theobald Smith stated that as yet he would be guided in his opinions by inferences made from the study of natural rather than artificial infection. But the subject is one which is certain to be pursued further and to arouse much discussion.

LATENT TUBERCULOSIS FROM CHILDHOOD.

The old controversy over latent tuberculosis dating from childhood is still waging, chiefly owing to the recent revival by Von Behring of Baumgarten's earlier views, Von Behring suggesting that the disease enters in childhood through infected milk, thus upholding the ingestion theory. Some find an answer to this in the fact that in Japan, where tuberculosis prevails, milk is not used as a food for either children or adults.

Certain it is, however, that tuberculosis does often begin in early life, often remaining latent or involving only the lymph nodes, bones or joints, to extend later under the influence of physiologic and anatomic changes and special exciting causes. But the extreme views of Baumgarten and Von Behring are vigorously opposed by many of the best pathologists and clinical observers.

HUMAN AND BOVINE TUBERCULOSIS.

The views of Koch, expressed at the London meeting of the International Congress, regarding the relationship of bovine and human tuberculosis have not met with general consent. Of late especially have they been effectively opposed by Theobald Smith, Ravenel and others. We are therefore not warranted in surrendering our fear of human danger from bovine tuberculosis nor in relaxing the preventive measures based thereon. At the same time it has been shown, chiefly by Theobald Smith, that there are recognizable differences between these varieties of tubercle bacilli, differences which perhaps warrant the identification of one or the other variety as found in different tubercular lesions in man. It is possible that further researches may show that the bovine variety is especially likely to be the cause of certain forms of human tuberculosis, and thus may more light be thrown upon

the mysterious variation of tuberculosis in human beings and upon our preventive and curative efforts.

THE WORK IN INDIANA.

The tuberculosis commission appointed by the governor upon the order of the legislature of 1905 has finished its work, made its report to the General Assembly, and with the end of the last assembly has passed out of existence. This report is at hand for distribution, so that each member of this association may have a copy. It is hoped by the chairman of this committee, who was also secretary of the state commission and to whom the preparation of the report was delegated, that it may prove of interest and of some value to the physicians of Indiana. In some sense he has felt himself to be their representative upon the state commission, and after the action you had taken in the matter has not hesitated at times to speak in your name to those upon whom responsibility for action rested.

As the time for the meeting of the legislature of 1907 approached it became very evident to the secretary and to other members of the commission, after repeated conferences with state officials and with those influential in legislative matters, that we should have something of a task to secure favorable action upon the proposition to establish a state institution for tuberculosis at this time. There was a general sentiment in favor of the modern anti-tuberculosis crusade and of some action committing the state to a part in it. But there was an equally strong sentiment toward conservatism regarding the expenditure of much money for the purpose at the present. The large obligations already undertaken in the building of a new insane hospital, a new school for the deaf and dumb, a new industrial school and reformatory for girls and an epileptic village made the governor and others feel that we must go slowly in immediate outlay for an additional state institution.

Much as we regretted the prospect for curtailment in the realization of our desires and convictions, we were not unprepared to meet the alternative of accepting a modest beginning and a small appropriation or a complete rejection of the whole plan for which we had so long labored. To Mr. Richard Elliott, a member of

the house and of the ways and means committee, and later to Mr. Cavins in the senate, both members of the commission, is due the chief credit for finally carrying the measure through the intricate paths of legislative action to success.

The report of the commission was approved, its recommendations in general accepted and the bill for the establishment of a state hospital for treatment of early pulmonary tuberculosis, as modified by the governor and the attorney-general in conference with the commission, was passed. It involves an appropriation of $30,000 to buy the necessary land, the appointment of a commission to select the land, and with the money to be provided by subsequent legislative act to build the institution. A board of trustees is later to be appointed to take charge of the hospital, to appoint a superintendent and to manage its general affairs. Beyond the purchase of the land nothing can be done until another legislature two years hence makes the necessary appropriations. But it is at last settled that the State of Indiana will begin to do for the tuberculous invalid who can not adequately provide for himself what she is doing for the insane, the blind, the deaf, the feeble-minded and the epileptic. And thus our labors and yours have not been in vain.

The last legislature also strengthened the hands of the State Board of Health, thus enabling it to go at least somewhat further than heretofore in its combat against tuberculosis and other preventable diseases. Of these matters the report on public health will speak.

All along the line the anti-tuberculosis movement is gaining strength. Several additional states have established or are in process of establishing public sanatoria, and the question is agitated in others. The preventive work in New York city is bearing rich fruit and affording an example for other cities to follow. The National Association for the Study and Prevention of Tuberculosis is extending its influence and lending its service and aid in all directions throughout the country.

The International Congress upon Tuberculosis is to meet at Washington in 1908, and plans are already under way to make its discussions memorable and influential. The sociological aspects of the tuberculosis problem are receiving wider and more serious attention, and everywhere thoughtful men and women,

physicians and laymen, are realizing that the times are ripe for a united effort to utilize the new knowledge, to improve and extend the modern methods of treatment, to aid the afflicted and to protect the well. Everywhere men are awakening to the view that tuberculosis is usually recognizable early, that so recognized it is amenable to more successful treatment, that there is fair promise of still more successful treatment in the future, and that meantime it is in large measure a preventable disease and must be prevented.

DISCUSSION OF PAPERS BY DOCTORS STEWART, CARTER, TUCKER, BLOSSOM AND POTTER ON TUBERCULOSIS.

Dr. F. B. Wynn, of Indianapolis: The slogan of this question is that tuberculosis is a preventable and a curable disease. Therefore, it becomes our bounden duty as physicians to go before the world as teachers of these great truths, and there is not a day but we may teach them. I fear all too often we do not teach as we should. At any rate, it is impressed upon me day after day as I come to the bedside of patients that they have not the knowledge that it is a preventable disease; that it is, as has been represented in the papers, an infectious disease; that there is a cause for it which we know to be as true as that the sun shines. We are not sufficiently awake, it seems to me, oftentimes in teaching our patients these facts.

Now particularly in reference to the infectious nature of the disease. How often we see at the bedside carelessness shown—papers spread upon the floor to spit upon, and more frequently than this the handkerchief which is used and tucked under the pillow, or little cloths torn into long ribbons and rolled up. We see this over and over again, and it occurs, too, gentlemen, when doctors are in attendance. I have seen it—intelligent physicians failing to impress upon patients that the infectious matter in the sputum is the principal factor in the spread of this protean malady. It becomes our duty to say to the tuberculous patient that the sputum contains the infectious matter which may reinfect himself and the other members of his family. We must preach this constantly. I like to draw analogies in talking to people. I use this illustration frequently: If there is a lion in a cage you do not doubt its viciousness, and that liberated it might destroy you. Now I want to say that the excretions of consumptives are

just as destructive as the lion, and the germs as capable of certain proof as the existence of the wild beast. These germs may be cultivated and will produce the same disease. So it is not visionary, it is demonstrable truth.

Now the question of fresh air. What a prejudice we have to combat there! And I believe the doctors encourage it, too. Don't you hear doctors say sometimes to patients, Don't expose yourself unnecessarily; don't get in the draught, and all that sort of nonsense, and that is what it amounts to. Here again I like to use a familiar illustration—one you have seen—the mouse under the bell jar when the air was exhausted, and you have seen it go into convulsions and die. Why? Because the oxygen was exhausted. It was necessary to the life of the animal, and when taken away it died. And why did we feel disagreeable a while ago in this room before Dr. Hurty opened the windows? Because we had consumed the oxygen, and we felt better when the windows were opened. And so with these familiar little illustrations we can teach the people that oxygen is necessary. We can not get it in a close room if we have the windows shut down and breathe over and over again the air of that room. It becomes impure. Why not open the windows and let in the air? Now the education of your patients is the thing to be accomplished.

Another factor, it seems to me, in this great question is the education that will come from hospitals; and all thanks to Dr. Potter and Dr. Hurty and those interested in this project of a state hospital. We can not take care of all the consumptives in this state in that hospital. We have in Indiana probably 40,000. Probably in this room are two or three. One in sixty, I believe the statistics say, are consumptives. But we can take care of one hundred. They can be trained rigidly in the regime necessary to secure results taught by Trudeau at Saranac and other institutions where they have accomplished things; and as these patients go to our institutions and learn of the work they spread the gospel, and the good work goes on.

And there are other factors. One is very important, and that is the matter of exhibits. It is possible by this means to educate the public along this line. They need not be elaborate, but small folders or other devices that might be placed in public libraries,

railway stations and so on, that contain illustrations of the different types of the disease, the open air treatment, and so on, and in this way educate them up to the fact that consumption is a preventable and a curable disease.

Dr. Theo. Potter, of Indianapolis: In the few minutes allotted to us in the discussion of these papers I wish to go to the two extremes of the question, to the questions of early diagnosis and the results of treatment. We are constantly reiterating the injunction to ourselves that we must make the diagnosis early. And it is true. We are told often in this day that the bacterial diagnosis is always a late diagnosis, which is not always true but usually so. That earlier than that is the physical diagnosis. And that is true. But what I wish to mention in the matter of early diagnosis is this: that if we are to attack successfully the problem of early recognition of tuberculosis we must attend to some things before the physical diagnosis. We must go back and lay stress upon what our predecessors did. And so I wish to emphasize one or two things here. They are the good old things. There are of course a few who may train themselves in skill in the physical diagnosis of this disease, but the great majority can not make themselves expert in this matter. They may be fairly expert but not highly so, and it is to them especially I would speak, the great majority who have after all to deal with this question. In the first place we must study the things which would lead us to fear tuberculosis in a person, as did our predecessors. In the second place we must study the things which would lead us to suspect tuberculosis. For no matter how skillful a man may be in physical diagnosis, of what good is it unless his suspicions are aroused? What good is it if next door to me is the most skillful diagnostician unless I suspect my patient has the disease and take him to the next door expert? Study the family history. Whether it means heredity or not, the fact is that tuberculosis does exist with unusual frequency in certain family circles, and therefore we should suspect it in an individual belonging to such family. Study the life history which makes one more susceptible to that disease, like depriving him of fresh air and sunshine, and those conditions of life which we know would make him especially liable to the infection. Study the history of any large number of cases of tuberculosis and you will find that five or six things are

the things that give early warning of the development of the disease. What are they? An insidious and otherwise unexplained decline in health, with anaemia, dyspepsia, loss of weight; loss of strength, insidiously developing fever, insidious and otherwise unexplained cough, a stitch in the side; not the indefinite pain people often complain of, but that peculiar stitch in the side, the real pleuritic pain, that so often means beginning tuberculosis. And finally the spitting of a little blood in the great majority of cases in the early half of life means pulmonary tuberculosis, and only careful investigation should exclude it. These are the things I have to say in regard to the early diagnosis. We have heard so much said, and wisely too, about the bacteriological and the physical diagnosis that we should think about the significance of things of this sort which lead up to the definite physical diagnosis.

Now at the other extreme we have the treatment, and I want to say this, and I say it not in criticism of the splendid paper of Dr. Blossom setting forth what can be done and what is being done in the institutional treatment, nor in criticism of the paper of Dr. Tucker regarding the modern home treatment, for we all know what can be done by its systematic application; but this is what I want to say: that the application of these so-called modern plans of treating tuberculosis for a limited period of time in the great majority of instances does not cure tuberculosis; it arrests the disease. We have had so much to say about the cure of tuberculosis that we are sure to mislead ourselves and the people unless we bring ourselves back to this, that the application of the treatment for a limited time will in the great majority of cases, if applied properly, early arrest the disease, and after that is done then the home physician or the sanitarium physician who dismisses the patient "apparently cured" has still upon himself the pressing question of the cure of tuberculosis. And I am sure as the years pass, though we realize the splendid advance that has been made in the arrest of tuberculosis, we will still have impressed upon us, as Dr. McCaskey has said, the problem of the cure of tuberculosis. And so our patients will come back to us with the question: by what management, physical, mental and moral, can we so influence them that gradually with the passing years we can bring about that healing process which means the end of tuberculosis?

Dr. Webb, of Colorado Springs: I have been working now nearly thirteen years on tuberculosis in Colorado. With us in Colorado our patients are able to live and do live out of doors, the majority of them, eighteen hours a day. It is unnecessary to go into the climatic conditions there. You all know of the constant sunshine and the facility with which our patients can get out of doors, the mild winters and the sleeping shacks built upon all properties. Colorado Springs is made up of consumptives from bootblacks to the presidents of the banks. Most are or have been consumptives; but they are not all well. And so it is that many of these patients are sitting around on the porches of the sanitariums and on the farms waiting to be cured; and what are you going to do with them? And that brings up the point about promising the cure of consumption. It seems to me few really get well of tuberculosis. After the first short time the secondary infections occur and you arrest the disease, but you do not get them any further. Dr. McCaskey said by proper food, air and treatment you can get up the opsonic index. You can not get it up. In all the sanitaria in Europe they had a low opsonic index, and you can not get it up; and it is so in Colorado. These people in Colorado are cured or, more strictly speaking, the disease is arrested, but the index is not raised. They are able, however, to do something. The chief feature being emphasized abroad today and also in the Adirondacks is the occupation of their consumptives. It is most important that they should be mentally occupied. After a few months' treatment in a sanitarium they get so far, and then what are you going to do with them? They must have something to do, and the thing to do is to make them work. Can you make them work here? I believe they can do it to a very large extent, but I do believe from my experience that in the west they can work more and longer, and many more years, even if they do not get well, than in other climates. The outdoor sanitarium cures more cases than the indoor in the proportion of three to one, and those cured at high altitudes are more lasting. We have dozens of cases in Colorado cured, but if they go east they will break down again. They are all low in the opsonic index, every one of them.

Dr. J. N. Hurty, of Indianapolis: The statistics of our state, as well as the statistics of other states and other countries, show

us that tuberculosis is almost a negligible quantity under the age of five years. Right after five it climbs rapidly. All the statistics on the graphic charts commence to rise. From ten to fifteen we have a very considerable rise. Prior to the age of ten annually in this state there is less than 100 persons who die of the disease; from ten to fifteen there are 150, a very sudden rise. Then from fifteen to twenty it will go up to 500, and from twenty to twenty-five we have over 800, and that is the climax. Then by the age periods the columns commence to grow shorter all the time.

Why is it that this disease attacks the young right in the very middle of the creative age, right in the useful period? I think I know one reason. In traveling over the state and examining the sanitary condition of the schools we find not one school in twenty that is furnishing the children air. Now an abundance of pure air and a proper amount of pure food will arrest the disease. Certainly we know that it is bad air and feeding that probably induces it. And so when we go into the school room where the children are shut up five or six hours a day, making them breathe over and over that foul air, is it not possible we are there inducing consumption? I know we are. And so it is a fact that the majority of schoolhouses in this state are veritable consumption traps, and is it any wonder that after forcing the children in these schools after the age of ten and fifteen they commence to have the pulmonary form of tuberculosis, and then from fifteen to twenty it rises still higher? And after we have spent our $375 educating them, and they get through the schools they die. That is not economy, and I am confident that not a little—probably 40 per cent.—of our tuberculosis is induced by our schools and our factories.

And then look how the farmer lives. Travel through the country anywhere and what surprises you is to find that little gable with one window in it. Stop there over night and you will find from two to four people in the room with one window. If that entire window was knocked out they would not get enough air, and they will keep that window tight shut or possibly let in a little air. Is it any wonder they have tuberculosis?

Let me impress upon you that when you ride through the country and see the little box schoolhouse, with three windows on a

side and heated by a stove, there is a consumption trap every time, and it is where we are killing children all the time. And what is strange, we are doing it in the name of economy. We save it on schoolhouses and spend it on short coffins. It is an absurd position to take, and yet we do it, and when we went to the last legislature to ask relief from them, guess what happened. Nothing was done of course, and I will tell you why. The people have not yet got up to that point. As soon as the people demand that these schoolhouses and all public places shall be ventilated, not by windows and doors but by machinery, then you will find that the death rate from consumption will go down. But there is one good piece of news. In comparing the death rate from consumption for the year 1906 we find there is a slight decrease as compared with the preceding seven years—some fifty-six fewer deaths—and that certainly is very encouraging.

Dr. W. D. Schwartz, of Portland: After all, this work will devolve upon the general practitioner. A great lesson has been taught us here tonight, and we appreciate it. If the general practitioners forget what has been said to them and say nothing about it to their people when they get back home the great benefit from this lesson is going to fail. It is our duty to go back and preach the great gospel of air and sunshine. And when it comes under our notice that a case dies in a house and the room is not disinfected, as I have seen it, before another innocent family moves in it is our duty to warn them. Another thing. When we step into houses and find the windows all shut down and the curtains down because the sunshine fades the carpets and draperies, and because it keeps the flies from getting into the newly papered rooms, if we try to convince the housewife and mother that it is better to have the color fade from her carpets and draperies rather than to have the glow of health fade from the faces of her children she will see it in a different light than she has before, and if she sees that it is less cost to pay for coal and heat than to pay doctor bills and funeral expenses she will look at it in a different way. And in regard to the schoolhouses, public sentiment has not been brought up to the point of seeing and knowing how these things should be improved upon, and if the general practitioner will help to teach these things to the people, and they begin to see what is necessary there will be no trouble about getting legislation along this line.

Dr. B. Van Sweringen, of Fort Wayne: The arguments advanced here tonight have been upon the hypothesis that this contagion is conveyed to the respiratory tract, and I presume that is so. But quite recently I had a case of tubercular meningitis in which the bacilli were demonstrated in the spinal fluid and membranes about the pons and medulla, and absolutely nothing was found in the lungs or any other structure. That is to say, the case was a primary meningeal tuberculosis. How it got there I do not know, except it possibly came by way of the blood stream or through the nasal passages and was conveyed directly through the lymphatics, through the cribriform plate of the ethmoid and the meninges. Tuberculosis may arise in other parts of the body than the lungs, and when it does it is probably not an inhalation disease. Cases of tubercular meningitis are not common, but I have had two cases within the last month in my own practice.

Dr. A. E. Sterne, of Indianapolis: In spite of the experience we all have in dealing with this subject we are constantly making one very serious mistake, and with all the respect I have for the climatic conditions in Colorado and New Mexico and Arizona and those high altitudes, where I made a long stay, the greatest mistake in the world is to send patients to those high altitudes for a short sojourn, and Dr. Webb placed emphasis on that. They go there and stay, and come back to the low altitude, and the malady shows itself in the fulminant form. We should either cure our patients or nearly cure them at home, in this altitude in which they are to live afterwards, or we should send them away to live away from home. For when they go back a second time they do not do nearly so well. There is an economic reason for this. We must all earn our living, and it is the greatest folly in the world to send a patient west in a physical condition in which he can not earn his living. If a man goes from this altitude to a higher altitude he changes his breathing basis. In a high altitude we breathe more superficially. What is the result of that? We are actually resting the diseased portion of the lungs. We are doing as we treat inflammation anywhere else, putting it at rest. Now it is natural when he comes back to the low altitude that he must take deeper breaths, and he stirs up the old foci of infection. If we want our patients to live at this altitude let us cure them at this altitude. We can not do it so rapidly as in the high altitudes of Colorado and New Mexico and Arizona, but do

not send him for six months or a year to come back here and break down more rapidly.

Dr. Case: The strong objection I have to the home treatment is the family. In contagious diseases we separate the sufferer from the family, and so in tuberculosis with the patient at home we subject the family to the danger of infection almost certainly. If we keep him at home he loses his appetite. That is one of the principal things that occurs. Exercise sometimes helps us to get an appetite, but we do not want him to exercise. Now. if we send him from this climate to a higher altitude he gets a better appetite, and that is one advantage.

I take issue with Dr. Sterne on one point. The rare atmosphere of the high altitude makes the individual expand his lungs to get sufficient air to supply the demand of the system, and the circulation in the lung tissue is improved. The expansion of the lung tissue aids the circulation, and for that reason it is a benefit to the patient. Another reason is that we want the patient in the open air, and we can keep him there all the time, which we can not do here. In regard to the time he is to stay there, we should never send a patient to the west or to the higher altitudes with the idea that he is to come back to live. That is essential. A patient who goes west and returns for a visit twice fails to improve the third time.

Dr. Young, of Valparaiso: In tuberculosis we must not forget that the great majority must be treated in their home localities and climate, for the reason that the numbers are so great that it would be physically impossible to transfer them to some other state. Now the problem of attacking this disease here consists in two things—in the treatment of those who have the disease and the protection of the public in such a way as to prevent the spread of the disease. The treatment those who attend medical associations know, but unfortunately physicians are not all regular attendants here. We see about the same crowd each year. There are a lot of stay-at-homes who do not learn to recognize tuberculosis early and do not learn to treat it properly. How then shall we attack it in the way of treatment? We have made a good beginning and we should attack it in a systematic way. This sanitarium idea is a good feature. It will educate the pub-

lic and it will educate the physicians. A few physicians scattered over the state become educational forces, and after the value of this institution has penetrated sufficiently deep I think we will be ready for county institutions. Now we have institutions over the state for treating this. We have one in Porter county that cost $25,000. It accommodates about a dozen. I think every one of these institutions will be an educational factor among the people and the physicians until eventually the disease will be sufficiently recognized and prevented in this way.

Dr. Frank Bevier, of Waterloo: We are talking about consumption. In building a structure we always speak first about the foundation. Dr. Hurty spoke about more people between the ages of fifteen and thirty dying of tuberculosis, and suggests the need of ventilation in the schools. But I have observed that many young people, especially children, have poor shoes and are poorly clad in the country and in the small towns, and it may be the exposure they have that lays the foundation of the disease and of other pulmonary diseases.

Dr. J. C. Blossom, of Mt. Summit: I have been pleased with the interest manifested in this subject. Every one working along the lines of the treatment of tuberculosis welcomes gladly the scientific and experimental knowledge that has been hinted at in the various papers today. While these things are well, we must not forget that there is a practical side to this question, and while the scientists are looking forward to the day when the vaccines and antitoxins may possibly be of benefit, we must not forget the fact that tuberculosis is stalking straight along through the land today, and we must be about the treatment of tuberculosis while we have the opportunity. It is related that a patient was very sick. A doctor of a scientific turn of mind, after taking samples of the secretions and excretions and making charts and analyses, went back in a few days to make the diagnosis. In the meantime Dr. Practical came along and cured the patient. I think that represents the situation. We must not forget the fact that tuberculosis is an ever present evil, and we must attack it persistently until something is developed that will give us good results and be capable of general application.

Dr. G. W. McCaskey, of Fort Wayne: Tuberculosis is the greatest problem which confronts the medical profession today. It is also among the greatest problems which should engage, and to an increasing extent is engaging, the attention of the general public. The least consideration of some of the facts stated here this evening, by Dr. Stewart, for instance, in the history of tuberculosis will at once convince any one of the reasonableness and truthfulness of this statement. The difficulty we have before us in eradicating this disease is indicated by the fact brought forth that we have understood the nature of this disease for a quarter of a century, and yet it goes marching on, decimating the populations of the civilized world.

In regard to the treatment it must be considered from two points of view—from the point of view of the public with reference to the protection of those who come in contact with it and from the standpoint of the patients themselves. Enough has been said to indicate what is necessary to protect the public. The germs are found in the sputum, and their destruction is necessary for this protection. Coming to the treatment of the patient himself, what are the rational principles that should underlie all therapy? In the first place, as has been brought out, there is no specific, and perhaps there never will be, and the energies which have been spent in searching for a specific could better be spent in other directions. What we must do is to strengthen and develop and reinforce the defensive mechanism of the human organism invaded. Briefly, what are these defensive mechanisms? A micro-organism, the germ so frequently mentioned and described this evening, gets into the system, and unless the system is able to overcome it produces fatal disease. How does the organism overcome this micro-organism? There are two lines of defense. First the micro-organism is attacked by two agencies—phagocytosis and bacteriolysis. Phagocytosis is the destruction of these germs by certain cells within the body, and it has been found necessary, in order that they may be destroyed, to be prepared. This is the opsonic theory. Ten years ago this discovery was made, and recently Dr. Wright has given it practical value. We have other agencies as well. What we must do if we accomplish the best results is to strengthen these defenses on the part of the human organism. We can do this in one of several ways—

by ample nutrition, as brought out tonight, not by overnutrition, not by forced nutrition, but by ample nutrition which is adapted to the individual needs of the case at the time as tested by his digestive capacity. Fresh air has also been mentioned. A correct hygienic life is absolutely essential. I have no doubt by the application of the opsonic tests we will find these very agencies are capable of producing a rise in the index, possibly not as much as vaccine therapy, but to a great extent. It is along these lines we must work in individual cases in order to raise the defensive processes of the body. The vaccine treatment which has been mentioned is the process which prepares the germs for destruction. It is too early, I think, to indorse some of the statements made this evening in regard to vaccine therapy in tuberculosis. If we can get the cases early enough when strictly local they may be of great value. They have a great future, but at the present time, it seems to me, they have the greatest effect in local surgical infections. But in the earliest stage of local pulmonary infection I believe it is strictly comparable to a surgical infection, and if we can get the cases soon enough, if we can detect a lowered opsonic index early enough, we may be able to accomplish something along these lines. It remains for the future to determine just what its field is.

In conclusion, Mr. President, I wish to reiterate what has been said again and again, that consumption is an eminently curable disease if taken early; that it is a preventable disease; and in the face of these facts to allow it to go along slaughtering thousands of victims in this country is a social crime of the first magnitude.

TUBERCULAR PERITONITIS.

BY CHARLES L. WRIGHT, M. D., OF HUNTINGTON, IND.

Tubercular peritonitis is of sufficient frequency to demand an intimate acquaintance with its symptoms, treatment and prognosis. So insidious is its presence at times and so masked that diagnosis seems impossible until disclosed by surgery. With ten cases upon which I operated in only two was a fairly positive diagnosis made until the abdomen had been opened, with two others a strong suspicion, leaving six entirely accidentally disclosed. One case was diagnosed as an ovarian tumor, as it came to me at a time when even my literary knowledge of the disease was very limited. But with a more extended knowledge of the subject I think the mistake would yet have been probable in this case. In another case a young lady twenty years of age had become so reduced in flesh that she appeared like a breathing skeleton, having been bedfast three months and the symptoms of the disease extending over a period of eleven years. No diagnosis had ever been made by the half dozen different physicians who had at divers times attended her. I was called by the attending physician when the patient was at death's door on account of a tumor in the left pelvic region. The tumor, as large as the fist, was an enclosed abscess involving the necrotic tube and ovary. Upon opening the abdomen in median line no serum exuded, but the bowels and pelvic organs were matted together by the intense general tubercular peritonitis. The abdomen was lavaged with about five gallons normal saline sal., most of which passed in and out of the abscess cavity and a drainage tube introduced. The radial pulse before and during operation was about 180 to 200, and so continued for two weeks afterward. She was unconscious for a month. Variations in treatment were continued for six months, when she was about fully recovered. This was more than five years ago and when I saw her last May she seemed in perfect health. I mention this case in some detail to show that we may hope, even at death's door, in some forms of the disease to cure by surgery. Seven of the ten cases are living after a period of from four to five years.

I have suspicioned tuberculous peritonitis to be existing in several other patients and been confirmed in my suspicions by other physicians when, upon opening the abdomen, other pathological conditions were found to be the cause of symptoms. Kelly of Johns Hopkins and other authors speak of the disease existing in some persons whose general appearance is of rubust health, and the disease discovered during operations for accidental injuries. Therefore, tubercular peritonitis can seldom be entirely eliminated in the diagnosis of abdominal and pelvic disorders and must generally be considered as a possibility.

FORMS OF THE DISEASE.

Three forms of tuberculous peritonitis are recognized: (1) The ascitic. (2) The fibrous. (3) The suppurative or ulcerative form.

In the ascitic the abdomen is filled with clear serous effusion. The peritoneum, both parietal and visceral, is covered with small nodules. Wherever one looks or feels the peritoneum is thickly studded with fine, rough granules. The intestines lose their smoothness and polish and look red and rough, and sometimes the congested-looking surfaces bleed easily. The fluid is free in the peritoneum and there are no adhesions as a rule. The tubercles being so thickly deposited in same cases, nodules and tumors are palpable. The omentum may be an inch or more in thickness and be doubled up or puckered and drawn in toward the greater curvature of the stomach. The source of the infection is sometimes not discoverable, but it is usually a fallopian tube, appendix or mesenteric gland.

The fibrous form, said to be comparatively rare, is due to a similar deposit of tubercles to that already described, but there is a complete absence of serous fluid. The adhesions are so extensive that in some instances no real peritonial cavity is left. In certain instances both the ascitic and fibrous forms exist at the same time. For instance, a large cyst may exist in either pelvic region which can not be distinguished from an ovarian cyst, while other parts of the abdomen may be matted together, making it impossible to break up adhesions. Such was the condition in one of my patients upon whom I thought I was operating for an ovarian tumor. I merely evacuated the fluid and closed the abdomen and the lady promptly recovered from all

signs and symptoms. About one year afterward I removed some tubercular enlarged glands from her neck and axila, and for two years since she has been in fairly good health.

The ulcerative form is found in those cases in which the tubercles have undergone caseation, and as a result of this suppuration occurs. The pus is localized and abscesses are found, especially near the focus of origin, such as the appendix, fallopian tube, etc., but they may be near mesenteric glands in other parts of the abdomen. Sometimes the fluid is not thick pus, but thin and purulent. This form of the disease is said to be common in children. One of my cases was a child four years of age, which did not recover after the abscess and caseous tumor had been opened and drained, as it was near the surface of the middle abdomen. The child lived three months after the operation, but apparently died from inanition.

It is said that the ascitic form is the most favorable for surgical measures. In fact, nearly all cases recover if the abdomen is merely opened and by the gentlest means the fluid is removed and, if possible, the focus of infection removed. This latter is not always possible, as sometimes the focus of infection is not found or discernible. The necessity and advisability for surgical treatment has excited great interest and frequent discussion. I have inquired of surgeons of large clinics as to their opinions and results in regard to surgical operation in tubercular peritonitis. In one instance a surgeon of wide renown had encountered but comparatively few cases of any kind and his results had not been good. Another surgeon of wide experience showed me some interesting facts in his case record, and had operated upon an unusually large number of cases for the size of his clinic. He absolutely refused to drain any of his cases and had fairly good results, especially good in ascitic cases. Among a half dozen leading surgeons, upon inquiry, I found their experience and results and opinions differing widely, except as to the ascitic form. The results of surgical treatment have been studied by many writers. Rorsch in 1895 gave the result of examination of 358 cases. Thirty-two patients died as a result of the operation, fifty-one patients died within eighteen months as a result of recurrence of the disease or of an extension of the disease in areas affected before operation. The remaining two hundred and seventy-five cases all showed improvement. In sixty-three of

these over two years had elapsed from the time of the operation and all were in good health and free from obvious disease. Wunderlich in a series of three hundred and forty-four cases found eighty-one patients died as the result of the operation. Of the remainder, eighty patients had remained well over three years.

These lists undoubtedly include cases not suitable for operation. In the ascitic or mixed forms the results show good in eighty-five to ninety per cent. of cases. Early operations show best results, although patients have been saved from death at the very latest stage of the disease. In Czerney's clinic forty to fifty per cent. of cures were recorded, and in more recent years, when more discretion has been used and cases selected suitable, or so supposed to be, the results have been very favorable. If, after a fairly positive diagnosis has been made and medical treatment has been tried for three months with no benefits accruing and the disease is of the ascitic or mixed form, I believe past results justify the surgical procedures. I am sure that in all my cases operated upon the medical treatment had been a signal failure and had been extremely tried. I can not yet agree with some writers that none but the ascitic form holds out any inducements for surgery. I am sure that in the case above mentioned of the young lady who was so near death's door and would surely have died had the operation been deferred forty-eight hours, that her case was of the ulcerative form, as there was no ascitic fluid in the abdomen. The adhesions of the peritoneum were so dense and diffuse as to make it impossible to expose the intestines and peritonial cavity. That abscesess were formed in both sides of the pelvis, the left tube and ovary sloughed and came away with the copious pus. Drainage was instituted for weeks in both sides with copious discharge. What would have resulted under such conditions under medical treatment alone? And yet we are told none but the ascitic form is amenable to surgery.

I would recommend that all cases become surgical ones, but that our prognosis to the patient and friends should be governed by the conditions found upon operating. Now, as to drainage, I believe some surgeons are too dogmatic when they advocate no drainage. It seems absurd to tap a pus cavity, wash it out and close the abdomen. In the suppurative form drainage is the only hope and the only attempt at accomplishing any good results,

and it is the only chance for the patient to recover, either medically or surgically considered.

In the ascitic form I believe nothing should be done in the way of drainage or of washing out the abdomen nor introducing medicament into the cavity. Simply gently drying and closing the abdomen. In the other forms I believe in washing the peritoneal cavity gently with a normal saline solution of proper temperature, and if pus is found a drainage tube or tubes inserted and ice poultices constantly applied, for weeks if required. It is not quite clear why the mere opening of the abdomen and drying the peritonial cavity has such a great and immediate influence over the disease. The explanation given by Gatti seems the most reasonable. He believes that the fluid poured out by the peritoneum after closure of the wound, like the fluid found in the general peritoneum when a localized appendicitis is present, is actively anti-bacterial and that it exerts a potent deleterious influence upon the tubercle bacillus. I have noticed a certain amount of fluid recognized on palpation and percussion after some days succeeding an operation. It may be that because we do not have this kind of fluid following the operation in the other forms of the disease that success does not follow. The slight traumatism and change of fluid on the parts when a normal saline is used in the fibrous and ulcerative form may have some bactericidal effect, at least I can not conceive of its doing harm. Certainly the disease in this locality, as well as in other parts, is yet to be adjudicated as to treatment, and we can now only use the knowledge we have, such as experience has taught. Many writers have elaborated upon the subject to great extent and I have refrained from alluding to much which is yet unadjudicated.

Now a word in regard to symptoms and diagnosis, because this part as yet is the most important of all to us clinicians. I have purposely left the discussion of this to the last, because I did not want what little I had to say about it forgotten in the general discussion. I want to impress the importance of taking tubercular peritonitis into consideration in a large per cent. of the diseases of the female generative organs and that it exists and is only discovered ofttimes during abdominal operations. In making an examination per vagina and by palpation sometimes we are prone to be guided as to diagnosis by what we expect to

find before we begin the examination. If we do not find any appreciable tumors or lacerations or pus exuding, or the much-abused displacement of the uterus like the much-abused liver, we are prone to give up the idea of anything being the matter except a functional disturbance, etc. It has occurred to me frequently to be called to operate by physicians upon a patient for some trivial troubles, when a thorough examination revealed the real magnitude of the disease, and had an operation been done for the trivial trouble no benefit would have been derived. I am sure that certain patients would not be treated so long by mild measures which can do no good, should more pains be taken in examinations and forming a correct diagnosis. If it requires the study of weeks and frequent exhaustive examinations to come to right conclusions it is better than to be superficial and go ahead with some treatment as a mere matter of guess work and convenience.

Pain is the most constant symptom and is referred to the lower abdomen, back and pelvic organs. It is usually persistent, and in women exacerbated by menstruation. It varies all the way from a continuous ache or soreness to intense suffering, sometimes compelling the patient to stay in bed. Patients complain differently in regard to the pain, but it is usually constant with exacerbations. The abdomen is often distended with flatus, and may be more or less permanent. There is often nausea and vomiting, or, as patients say, a misery in the stomach. Intense pains in the ovarian regions and some headaches are frequent. The lower abdomen is tender on pressure and some patients can not endure the erect posture with comfort. Poor appetite and dyspeptic symptoms are frequent. Fever is not always present, although frequently a slight temperature curve of from ninety-nine to one hundred degrees is constant. Constipation in about half the cases and some complain of pain during defecation or peristalsis. Pain in urination is the most constant and characteristic symptom. Frequent micturition and sometimes incontinence is observed. The menstrual history is variable. Women usually complain of bladder symptoms in all pelvic troubles and are prone to think it is the bladder where all their ailment lies. Whenever a woman complains of bladder trouble I always look for the disease in the uterus tubes and ovaries. Note how similar are all the symptoms of tubercular peritonitis in women to other pelvic troubles. In men we can eliminate much of the cause for abdominal pain and tumerous masses.

In attempting to make a diagnosis of tubercular peritonitis it is evident that reliable symptoms are not always present. There are some cases, especially in men, that we can feel very confident in our diagnosis. In women a scraping from the affected uterus will show tubercular bacilli or may be discovered microscopically in the uterine discharge if pus exudes from a pyosalpinx.

To recapitulate in brief, our diagnosis may be based as follows:

(1) Often a sudden onset, it may be after a pregnancy or a miscarriage.

(2) A history of chills with slight fever, simulating typhoid fever.

(3) Gradual increase of swelling of abdomen.

(4) More or less abdominal pain, especially on walking or the erect posture.

(5) Pain on urinating.

(6) Pelvic masses or abdominal masses not easily outlined and not easily associated with the organs of the abdomen or pelvis.

(7) Apparent change in the position of these masses at different examinations.

(8) Great or less tenderness over the abdomen and pelvis.

(9) Sometimes an enlarged uterus.

(10) Evidence of encysted peritonitis.

(11) Emaciation—tuberculous facies.

(12) Slight persistent rise in temperature, often with subnormal moving temperature lasting for weeks.

(13) The discovery of tubercle bacilli in the uterine discharges or in the fluid obtained by tapping the abdomen.

But after noting all these symptoms most of our diagnosis is made by elimination and the proper knowledge of other possible abdominal and pelvic diseases. There can be no doubt but that some cases recover spontaneously; on the other hand, a large number suffer and show but little change from year to year; others grow progressively worse and die from rapid increase of the disease. With timely treatment all the pelvic cases ought to be cured by surgery and proper medical treatment. No case should be abandoned unless the patient should seem to be actually dying. None of my cases died because of the operation, and records show that surgical operation is so seldom the cause of death that it is not to be considered in the fatality causes.

THE USE AND ABUSE OF THE OBSTETRICAL FORCEPS.

BY GEO. T. M'COY, M. D., OF COLUMBUS, IND.

Mr. President and Members of the Section—Papers upon obstetrical subjects are far too uncommon in our medical societies today. The brilliant achievements in surgery have rather obscured the importance of obstetrics, so that even the laity consider an obstetrical case as an everyday affair and do not appreciate the attention obstetrics really demands. It has truly been said that "surgery is a science that all study and few practice, while obstetrics is a science that all practice and few study." If any of you will look back over your past experience of twenty or thirty years of practice among women you will notice two very significant facts. First, that a vast majority of the cases of diseases peculiar to women have had their origin in the process of parturition, and second, that almost every practitioner of medicine stands ready to assume the responsibility of the obstetrician, no matter how very modest may be his attainments in every other branch of medicine.

Furthermore, it sometimes seems as though the subject of parturition is worn so threadbare that it can have no interest for the vast majority of physicians, that the process is such a perfectly natural one that it is scarcely worthy of much serious consideration. It would seem as though the duties of the obstetrician were so simple, so free from difficulties that the subject were not worthy of any very serious or systematic contemplation. Yet, on the other hand, we see the evidence of scientific thought, of mechanical skill, of carefulness in detail in the work of a conscientious practitioner of obstetrical forceps; the idea which first suggested its construction was the substitution of an instrument for the human hand in the extraction of a living child, although their first use was in the interest of the mother rather than the child.

Of surgical operations pertaining strictly to the practice of obstetrics none equals in importance the artificial termination of

labor by the forceps. Compared with others its performance is more frequently demanded, and the result often depending upon the skill with which the instrument is used, involves the life of mother and offspring.

To attempt to answer the question as to the indications and contra-indications to the use of the obstetric forceps one must necessarily presuppose a good working knowledge (1) of the anatomy of the female pelvis, with the dimensions of its various planes and straits; (2) the ability to diagnose accurately the various presentations and positions. That no hard and fast lines can be laid down to be followed unfailingly of course is understood. It is almost impossible to mention all the indications for the use of the forceps, but in a general way it may be said that "the disproportion between the expulsive force and the pelvic resistance" is the chief and most frequent indication, and that a certain amount of experience with a good deal of common sense is necessary to enable one always to pick out correctly the proper time for their application. The knowledge of when and when not to use the forceps is not acquired by intuition but by the same painstaking means as is necessary to acquire any other knowledge.

Although the forceps has been in use more than two hundred years, and although it is confessedly one of our most valuable aids in facilitating difficult labors, the indications for its employment and the proper limits for its use have not yet been generally agreed upon. On the one side stand those who use the forceps whenever labor is at all prolonged, and on the other are found a larger number who say that it should be used only when danger to mother or child is imminent, and that the instrument through too frequent use has been productive of more harm than good. Between these extremes is found the greater part of the profession who use the instrument with varying degrees of frequency, usually less frequently than they should. If we look over the history of the forceps we shall see that there has been a gradual but steady increase in the frequency with which it has been resorted to, and that this increase has been attended by a steady reduction in both infantile and maternal mortality. Out of this difference of opinion and the discussion which has arisen in consequence of it have been evolved certain indications for the use of the forceps upon which nearly all are agreed, as follows:

1. In cases of rigidity of the perineum, where, notwithstanding fair pains, the head remains stationary in the vagina for several hours until a large, firm swelling appears on the head and the pains finally become weaker or die away.

2. In weak pains (that can not be stimulated) when there is reason to anticipate grave danger to mother or child from longer delay.

3. When the size of the head is disproportionate to that of the pelvis, the latter being only moderately contracted.

4. In convulsions, heart failure or other dangerous condition of the mother.

5. In prolapsus of the cord, placenta previa or cases where from any cause the heart beat of the fetus is becoming weak.

6. A failure of the head to recede between pains is always an indication for the use of the forceps, as this phenomenon indicates an undue pressure on the soft parts of the pelvic canal.

7. In any condition where speedy delivery is necessary in the interest of either mother or child the use of the obstetrical forceps is clearly indicated.

In regard to the foregoing and perhaps one or two other indications there is no dispute. But within the past twenty years there has been a distinct tendency to extend the use of the forceps so as to include a large class of cases where neither mother nor child is as yet in urgent danger, but where labor is delayed greatly, though not hopelessly. You must simply decide in this latter class of cases whether it is not better for the interests of mother and child to interfere at once than to subject them to the continuance of pain and other disturbances, even though you are reasonably certain that nature will finally triumph after hours of weary waiting. In deciding this question the skill of the operator should most seriously be considered. Another factor that should be taken into consideration in making a decision in these border line cases is that the first stage of parturition is governed by the sympathetic nervous system, and that the second stage is governed by the cerebro-spinal system, and while the first stage may be indefinitely prolonged without great danger, the second should not, for the exhaustion due to the strain on the cerebro-spinal nervous system is such as to warrant in many cases a speedy termination of the labor.

A very important factor in sizing up the situation as to the possible necessity for the use of the forceps is to take into consideration the elasticity and nonelasticity of the muscular structures of the pelvic canal. Strong and muscular women with strong uterine contractions will very often be unable to overcome the stronger resistance of the muscles of the pelvic floor and vagina, and if after carefully watching a patient of this description who is having good contraction pains, but with practically no advancement for a reasonable time, and it is not a question of minutes or hours, the forceps should be used.

The frequent death of the fetus in these cases, that is usually attributed to the use of the forceps, is almost always due to the prolongation of the labor and neglect to use the forceps earlier. After long delay—"letting nature take her course," to use a favorite phrase—when the powers of the mother are long since exhausted and the tissues are so swollen that the head is becoming impacted, either waiting for nature or any form of interference, whether by forceps or version, is apt to prove fatal, and it is such cases which unjustly swell the mortality charged by the older writers upon the forceps. The proposition that "danger is proportional to delay," both for mother and child, in conditions like the above is certainly only too true. For it is the early use of the forceps, when danger is only threatening, before the various or serious complications which attend natural labor have had time to arise, that their use is so often beneficial.

In the interests of the child, other things being equal, and above all the life of the mother not being in danger, it seems wise to curtail the period of labor as much as possible and not wait until the child's heart action becomes feeble. The shorter the labor the better for the child.

According to Professor B. Sachs, of New York, "there are innumerable imbeciles, paralytics and epileptics in the world today who might have been normal individuals had they been given 'a square deal' at time of birth; that a very considerable number of cases of infantile cerebral paralysis were either first-born children or such who had been born after prolonged, often dry, labor. Statistics of several hundreds of such cases showed less harm by instrumental delivery than by prolonged labor, although unskillful instrumental delivery had been a frequent cause of trouble."

If physicians were more confident of the safety of the forceps and of their own skill to apply the same, protracted labor would not be as powerful an etiological factor as at the present time. Dr. Sachs feels that "the medical men in attendance at confinements have for years followed a policy of indifference toward the welfare of the child, allowing too many children to be born into the world after labor unnecessarily prolonged, and in conditions of distinct disadvantage to them and to society for the entire period of their natural lives."

With all and more that might be said in favor of the judicious and possibly early application of the forceps there is still no operation that could be suggested for your consideration that is so unsettled as to the manner of its performance. Scarcely any obstetric subject could be brought up for discussion in a medical society that would evoke the expression of more diametrically opposite opinions, as, which is the proper method of applying the forceps, in relation to the diameters of the child's head or to those of the mother's pelvis? We should lay aside our prejudices against one or the other method and test both; not condemn one simply because we have been accustomed to follow the other.

The teachers of obstetrics in our medical colleges spend sufficient time in teaching the mechanism of labor, but the student learns little of the mechanism of the forceps until engaged in active practice, and then too often his education is obtained at the expense of his patient.

The chief element of danger to the child is excessive and long continued compression of the head; to the mother it is septic infection. "Unclean instruments and fingers and the presence of decomposed fluids in the genital canal furnish the fire, while traumatism opens the avenues of the mother's system to the spread of combustion." Asepsis is the remedy for one: the method of operating is the remedy for the other. The less force used to deliver the child the less traumatism results to the mother.

If we can determine by the employment of certain rules of operating that less force is required to deliver the child, that less traumatism results to the mother, that fewer mothers and fewer children die, then the best attainable results will be reached. And right here comes up the question, "What are the best operative rules?" Shall the forceps be applied along the sides of the

mother's pelvis and in its axis, grasping the head as best it may, or shall the instrument be fitted to the child's head, being introduced obliquely in the pelvis?"

The experience of many competent obstetricians has proven that the forceps may be applied along the sides of the pelvis and a living child delivered without damage to fetus or mother, provided the grasp of the instrument be relaxed when tractions are not in force, and the head is allowed to mold itself and rotate spontaneously. It is also true, however, that in case where the head and the pelvis are of normal proportions the more skillful procedure is the oblique application of the forceps, that is, in relation to the fetal head. Taking all things into consideration, it is better as a rule with all forceps to apply them with relation to the fetal head and not with relation to the pelvis. If you place one blade to the mother's left and the other to the mother's right you will catch the head in the oblique position, one blade naturally being placed over the occiput and the other over the brow. The head will then be engaged in a longer diameter, and not only is it more apt to be bruised, but labor is not facilitated in the way that it should be, and besides there is much greater danger of slipping of the forceps than if it was applied in relation to the child's head. It will be remembered that Hodge's forceps was made with the most decided pelvic curve, and it was necessary to apply this forceps with relation to the child's head and to disregard its relations to the pelvis. If you did not do so the vagina was badly torn and the perineum extensively ruptured. All modern forceps on the Elliott, the Naegeli, the Simpson plan, are not made as Hodge's, but are so constructed that they may be applied either way, with relation to the fetal head or to the pelvis of the mother. The great point in favor of the Elliott forceps is its long shank.

However, when the head is high up above the pelvic brim there is only one way to apply it, and that is in relation to the pelvis of the mother, one blade to the right and the other to the left. You grasp the head over the occiput and the face if it lies in the transverse position, which it usually does. The application of the forceps above the brim is a very grave operation, whether you use the Elliott, axistraction or any other forceps, and in performing this operation you are putting the life of the patient in jeopardy.

Without wearying you with statistics let us consider the advantages of frequent resort to the forceps skillfully used. 1. We save both maternal and fetal life. 2. We prevent the danger of swelling, impaction and the subsequent inflammatory complications. 3. We save a vast amount of suffering. 4. We greatly diminish the number of craniotomies. These are the principal advantages claimed to be gained by this practice.

On the other hand, a large number of dangers have been urged against it, such as laceration of the uterus, vagina and perineum, rupture of varicose veins, pelvic abscess from contusions of the soft parts of the mother, subsequent inflammation of the uterus or peritoneum and fracture of the pelvic bones, and for the child, contusions of the scalp or face, temporary paralysis of the face from pressure of a blade on the facial nerve, compression of the brain and fracture or depression of the cranial bones. All of these accidents have followed the use of the forceps no doubt, but those which are not trivial and temporary may be avoided if proper precautions are taken and if due care and skill are exercised; otherwise forceps are as dangerous as a uterine sound or any other instrument under similar circumstances.

To allow any primipara to go to full term without a careful pelvimetry examination and investigation into the capacity of the birth canal is doubtless absolutely wrong, but how many men in general practice are taking the time to do this? Measuring the pelvis for all primiparas and for all multiparas, with a previous history of difficult labors, will clear up many doubtful questions, and this should become a routine method in all of the class of cases just mentioned; the satisfaction of knowing the size and capacity of the pelvis through which you are expecting to deliver the fetus will amply repay you for the additional time and trouble, especially where an unexpected dystocia develops. It is much easier to measure the capacity of the pelvis than to estimate the size of the fetal head. A good rule to follow, however, that will be of assistance in deciding many questions is whether the presenting head can be forced into the canal by pressure from above; if one hand is placed above the pelvis and the fingers of the examining hand placed in the vagina it can be readily ascertained whether it is possible to compel the head to enter the superior strait, and if this can be brought about a short time prior

to the date of the expected confinement it is comparatively safe to assume that the same head can be expected to go through the main straits of the pelvis.

In applying the forceps a distinction must be made between (1) those cases where the head lies low in the pelvis or on the perineum, (2) those in which the head is at or above the pelvic brim, and (3) the intermediate cases midway between these two, where the head has fairly engaged at the brim of the pelvis but will not descend.

The first class of cases are very simple and easily managed, while those at or above the brim are far more serious for the mother and require all the care and skill of an experienced operator to avoid serious injury. In all cases the bladder and rectum must be emptied, so as to avoid risk of laceration or rupture by pressure of the blades; the blades should be warmed, rendered perfectly aseptic and well smeared on the maternal side with sterilized vaseline. The vagina should be sterilized if the forceps are to be carried into the uterus, else you are apt to carry septic material from the vagina into the uterus. The blades having been locked, gentle traction should be made during the pains, or if the pains are entirely absent, at similar intervals so as to give time for the perineum to dilate. As the head is about to emerge the instrument can be removed if rupture is feared, though the blades are so thin that they scarcely increase the circumference of the head, and sometimes they may be used to prevent rupture by preventing too rapid exit of the head through the vulvar opening. At this stage of labor the application of forceps is a simple and safe operation if the instrument is handled gently.

In the intermediate cases where the head has fairly engaged at the brim but will not descend, the cervix is usually retracted so as to be in less danger of being caught, and the head can not slip away from the forceps, a single finger, or two fingers at most, introduced into the vagina will serve as a guide for the blades, thus greatly diminishing both the difficulty and danger of the operation. In most instances of this class of cases of delayed labor the natural powers of the mother are sufficient to dilate the cervix and cause the head to engage but fail sooner or later to propel the head along the parturient canal. In these cases the application of forceps is not excessively difficult, and it is at this

stage that delay is most dangerous, and in which we would most strongly urge the application of the forceps if the pains become inefficient and remain so for two or three hours. These cases are sometimes miscalled high forceps cases; we put on what we ordinarily call the high, but really the medium forceps.

When the head is above the brim, however, the case is far different. A head freely movable but not engaged at the brim should not usually be considered as calling for the use of the forceps, as version is the first operation, but I have seen cases and had cases of my own in which forceps were carefully and successfully used. But to perform version and extract the child is fraught with less danger than the application of the forceps above the pelvic brim. When the head is above the brim the forceps operation must be acknowledged to be one of great difficulty as well as one of great danger. The added dangers are the liability of catching and tearing the cervix, the danger of sepis from introducing a foreign body within the uterus and the danger of pushing back the head and changing the presentation. Here the whole hand must sometimes be introduced into the vagina to guide the tip of the blade past the cervix, thus diminishing the space of the vagina and increasing correspondingly the difficulty of introducing the blades. Here, therefore, the forceps should not be introduced except in very urgent cases, and then only by those who have given special attention to the use of the forceps, as in inexperienced or unskillful hands they may do as much harm as careless catheterization in a case of enlarged prostate. Ordinarily the forceps will grasp the occiput and face and prevent rotation; so it should be removed after the head has descended into the pelvis, and reapplied if necessary so as to grasp the head transversely. It is both difficult and dangerous to rotate the head by the forceps.

When the head is arrested at the pelvic brim the problem presented is a complex one and merits the most careful consideration. The most skillful use of the forceps will not undo the mischief caused by exhaustion resulting from a too great prolongation of the labor. We must first be sure of the diagnosis. Why is the head arrested at the brim? It is frequently the case that the arrest is due simply to malposition of the head, and that by careful manipulation through the abdominal wall, assisted possibly by

one hand in the vagina, it is possible to push the head into the pelvis, and thus convert the case into one of medium forceps. "If the head is at the brim after labor has set in something is wrong, and it is the duty of the attendant to find it. If after a few hours of even moderate pains the head has not entered the pelvis something is radically wrong, and we must find it or stand convicted of incompetency to intelligently supervise the case." When the cause of arrest has been recognized and you have reached the decision that forceps or version is necessary you must take all the conditions into consideration, the condition of the mother and child and the operative skill of the physician, before deciding which operation promises the best chance of delivering a living child and which operation is the least dangerous to the mother. The method of choice will differ in the hands of different men according to their beliefs and according to their operative ability. Having elected which operation to perform, it should be scrupulously carried out after failing to deliver with the forceps. Version multiplies the dangers to the mother, and is almost always fatal to the child. Caesarean section promises more than either version or forceps in this class of cases where one or the other operation has been tried and failed. (See "The Forceps and Its Alternatives at the Pelvic Brim," by Dr. Wm. Gillespie, of Cincinnati, in Lancet-Clinic, July 14, 1896.)

We stated before that one of the greatest dangers to the child was undue and too long continued compression of the head. If this defect can be obviated by the use of any specially constructed instrument we thereby remove one of the greatest objections to the use of the obstetrical forceps. Therefore, the paramount importance of a thoroughly general appreciation of the value of the axis-traction principle in forceps application is imperative. The teaching of this principle should be insisted upon, as it is the foundation of all instrumental procedure which has for its aim the successful delivery of the mother without damage either to her own or the body of the child. By this standard alone is the use of the forceps to be judged.

The peculiar advantages afforded by the axis-traction principle may be summarized as follows: 1. It permits the application of the forceps at the superior strait without reference to the position of the fetal head, inasmuch as, owing to the freedom of lat-

eral movement and of rotation, the head is brought into the canal and permitted to take the position most favorable for rotation. 2. In cases where the head is obstructed at the inferior strait, and where the perineum is most likely to suffer, the axis-traction principle, by lifting the head off the perineum and under the pubic arch, will save lacerations that are ordinarily promoted by the short and the ordinary long forceps. 3. In contracted pelvis the more exact regulation both of pressure and traction effort must save many children and mothers. 4. At all positions along the pelvic canal where forceps are demanded the axis-traction instrument affords the safest and most scientific aid to delivery.

The axis-traction forceps of Tarnier is one of the most valuable instruments in the whole obstetrical armamentarium. I believe that the patient suffers less, and I do not believe that you come so nearly to exhausting yourself in the use of this forceps. The objection sometimes urged against the axis-traction forceps, especially in the medium or high operations, is that the rods of the forceps pull against the perineum and thus damage the soft parts. This is a very serious objection; but if we follow the rules laid down for the application of the axis-traction forceps we shall not do any harm to the perineum. A wide Sims speculum may be used to protect the perineum until the head is brought down into the pelvis if the rods seem to make too great pressure upon it. I have found this speculum advantageous in retracting the perineum where there is marked rigidity. The principle of axis-traction may be applied to the Elliott or any other long forceps.

Operators in maternities or who have extensive consulting practice are accustomed to the use of forceps especially constructed for axis-traction. The average practitioner may follow his profession for years without resorting to the high application of the forceps, and an axis-traction instrument may not be included in his armamentarium. If, however, he possesses that combination of judgment, practical aptitude and self-control, which is so important to an obstetrician, he will find his long forceps sufficient for success. The American models of long forceps previously mentioned are well adapted for axis-traction, and have repeatedly proved competent for the exigencies of these cases. While it is unnecessary that every practitioner should possess an axis-traction forceps, it would be well if some one in

every small city or neighborhood should be the owner of such an instrument, for cases not infrequently occur when such a forceps would be a boon to some mother and her unborn child.

The forceps is sometimes applied before it is really necessary, when the labor is simply lingering, although otherwise natural. An obstetrician should never be in a hurry. Art can not perfectly imitate Nature, although it may assist her. To interfere by application of the forceps too early is dangerous, as Nature not being prepared to act promptly and the head not having molded, the operator finds to his surprise that very powerful and repeated tractions with compression are required, and then often, after much difficulty, he finds a dead infant as the result of the forced delivery. Nature may be apparently slow, but she is generally sure, and while neither mother nor child is in danger there is no indication for the use of forceps.

Some authors apply the forceps in high breech cases when it is impossible to bring down a leg. Personally I have never met a case where the forceps to the breech was indicated, and as a rule the breech should be considered a contra-indication. But the application of the forceps to the aftercoming head in breech cases is sometimes indicated in cases where the unusual rigidity of the pelvic floor and external genitalia impede the delivery to that extent that forceps must be applied and rapid extraction made to save the life of the child. There are other indications for the application of forceps in head-last cases which I will not take up here. Although the cases in which the use of forceps in breech labors is required are very infrequent, the instrument should always be within reach, properly sterilized and anointed, ready for immediate use. And the axis-traction principle should not be forgotten in delivering the after-coming head.

All cases of operative obstetrics should be treated with the same attention and care as to asepsis as is ordinarily exercised by the most careful surgeon in doing an abdominal section. Septic infection of the lying-in patient only occurs as the result of a blunder, a blunder upon the part either of the patient, the nurse or the physician. You should approach such a case with scrupulous attention as to cleanliness. The patient, the bed, the nurse, the physician and all instruments to be used must be carefully looked after. In forceps cases you must sterilize your hands and

instruments, and as nearly as possible the genitals of the parturient woman. Clean clothes and clean bedding, clean towels and clean assistants should always be secured. Have all your surroundings as aseptic as possible. A man can not do good work as an obstetrician unless he can be surgically clean from the beginning to the end of his case. Do not be in a hurry, do not yield to the importunities of the family or the man who has charge of the case; take plenty of time to sterilize your instruments and get yourself and patient in proper condition.

I know of no case where death from chloroform or ether has occurred during labor, because anemia of the brain is not likely to occur while the woman is working hard; still an anesthetic should never be carelessly administered. I know of one death, however, from chloroform administered one hour after the completion of labor, and am led to believe that it was not intelligently administered.

I think the anesthesia should be carried to the surgical degree in all cases, whether you use ether or chloroform. This should be done not from a purely humanitarian standpoint but because of the muscular relaxation that is secured by this method. Involuntary muscular contraction often occurs in the anticipation or in the actual suffering of pain, and I am quite sure that if chloroform is used for the short, low and easy forceps operations, and possibly ether for the long, high and tedious ones, the percentage of good results, at least as to the condition of the pelvic floor, will be higher and you will be more satisfied than with the older and rather brutal method of delivering without an anesthetic still practiced by a small number of the profession.

If you have not been sure of the position of the presentation you should make a careful diagnosis after giving the anesthetic. A careful examination of the patient's condition and a correct diagnosis of the position of the head should always be made before attempting to use the forceps. The ability to recognize the various presentations and positions by vaginal touch is not easy, but the habit of examining each patient carefully and not being satisfied with the mere diagnosis of a head presentation will soon make this a possible and comparatively easy task. For with a proper knowledge of the location of the large anterior fontanel and the direction of the sutures the diagnosis of the various posi-

tions is readily reached. Careful diagnosis, careful asepsis and careful axis-traction are definite rules to be followed in all cases.

There is much difficulty in obtaining exact statistics as to the frequency with which the forceps are used. The figures vary with the country and with the operator. Ploss's tables for England make the least number of applications for any operator as one in 3,878. The operator with the greatest relative number was one in 7.8. Galabin says that the statistics from St. Thomas lying-in charity hospital appear to show a forceps rate of one to sixteen deliveries. The Maternity hospital, Philadelphia, shows the number of forceps applications in 1898 to have been one in eight. The Columbia hospital, Washington, D. C., about one in twenty. In Maryland maternity hospital, Baltimore, the forceps was used 142 times in 1,495 deliveries, or one in 9.4. Statistics of Cook county hospital, Chicago, from 1897 to 1905 show that 5.7+ per cent. have been delivered with the forceps.

From inquiry among physicians in private practice in this state I learn that the average of forceps cases varies from one in ten to one in twenty-five. Forceps are doubtless more frequently required among city bred than among country bred women.

In my practice, not including consultations, in 1,043 cases I have used the forceps in fifty-two, or in 5 per cent.; in the first 500 cases I used the forceps in fifteen cases only. This difference in the percentage is due partially to the fact that the first cases were all in the country district, where the development of the mother and the living of "the simple life" had much to do with the low forceps rate; and besides I was more inclined to delay and to refuse to use forceps in any case where I thought it possible for nature to complete the delivery, no matter how long it required. I am satisfied that I neglected to use forceps in several cases where the interests of the mother and child would have been conserved by their timely application.

I wish to report one case. Mrs. A., aged 37, primipara. In labor thirty-six hours before the head came down to the perineum. Head of child apparently normal. The head remained upon the perineum without distending it for three hours, the pains being fairly strong all the time. I then proposed forceps to the family, and they at once proposed consultation. I waited forty minutes for the consultant. When he came I found

that he never used forceps, and that in his opinion they were not indicated in this case, but that a full dose of sulphate of morphia to produce sleep and rest of the patient was all that was needed. And as I was somewhat tired he proposed that I should also take a nap, and that he would kindly take care of the patient for me while I was sleeping. I slept two hours and the patient one. I found her having hard pains and very little or no advancement, but in another hour she was spontaneously delivered of a plump, well developed dead infant, greatly to the credit of the consultant's skill and knowledge. The catheter was used for two days, and then everything seemed to be doing fairly well, but on the ninth day I was informed that madam "could not hold her water," and in making an examination I found a vesico-vaginal fistula, with quite a large area of necrotic tissue, involving the vesico-vaginal septum. An early application of the forceps in this case would have prevented damage to the mother and very likely have saved the life of the child. Vesico-vaginal fistula can be traced to protracted labor in not a few cases.

In my fifty-two cases of forceps delivery there are twenty-six medium forceps cases, the usually so-called high forceps cases, six cases in which forceps were applied above the brim, two cases to the after-coming head in breech presentation and sixteen cases of the low operation, where the head was resting upon the perineum. Mortality of mothers none; of the children, six, or 11.5 per cent. In two of the six cases death occurred on the second day, and they were both high forceps cases, or where the head was above the pelvic brim and not engaged. Version was substituted for the forceps twice, saving mother and child in both cases.

Some of the abuses of the forceps may properly be noticed. That clumsy, untutored and unskilled hands do harm with the forceps even at the lower strait can not be denied; and no man ignorant of the mechanism of labor and of the rules for using the forceps should ever undertake a high forceps operation. I am thoroughly convinced that the use of the forceps when not indicated or the failure to use them when strongly indicated is not in the majority of instances due to a lack of the proper knowledge, but is due to carelessness and neglect of the usual methods that these same men would follow in judging any other class of cases.

The worst abuse in the use of the forceps is brought about by the neglect of the very necessary preparation of the patient, instruments, nurse and obstetrician. If they do carefully sterilize themselves, instruments and patient they very promptly proceed to undo all this work by thoughtlessly handling unsterilized bedclothes, articles of furniture, and the forgetting that a single link may destroy the entire antiseptic chain.

The forceps is sometimes used for the purpose of economizing time, and to suit the convenience of the physician. The error occurs only rarely. They are more often used too late than too early.

They should not be used in hydrocephalic or macerated heads, as the forceps are very likely to slip.

Pelvic diameters indicating a canal too small to allow a normal average head to pass through is a contra-indication.

To continue the pressure upon the child's head by failure to relax the grasp of the forceps during the interval of making traction, or continuous traction and compression, is an abuse of the forceps. To use force in locking the instrument after its introduction and too great hurry in delivering the head at the expense of the perineum are also abuses. It is invariably important to make haste slowly and never abruptly drag the fetal head through any part of the obstretrical canal.

The forceps should never be used simply for the relief of pain, yet this is one of the common errors in its use.

The failure to remember that traction must be intermittent and always in the axis of the pelvis is one of the abuses of the forceps; failure in this respect will surely endanger the welfare of both mother and child. Haste in using the forceps and in improper direction of traction will sooner or later bring about ill results in the way of overstretching of the pelvic floor and perineal lacerations.

There is no criticism of the use of the forceps in the hands of the expert, the man who knows how to use it, and how to keep himself and patient clean; in fact, under such conditions it well might be used to advantage more frequently than it is. But, until the general practitioner has learned to be more careful and skillful in the use of this instrument, we may well counsel conservatism in the use of the obstretrical forceps.

To sum up: The abuse of the forceps consists in using it in improperly selected cases, unskillfulness in its application, too much hurry and the neglect of proper antiseptic precautions upon the part of the physician and all concerned, while, on the other hand, if properly used, the forceps is an effective agent in lessening both fetal and maternal mortality.

I am aware of the fact that in this paper I have offered nothing that is new to the members of this society, and the profession at large; the subject, however, is of vital importance and should be more frequently discussed in medical societies than it has been during recent years.

DISCUSSION.

Dr. Garrett Pigman, of Liberty: I am glad to hear Dr. McCoy read this paper. There have been too few papers read on obstetrics. It is one of the most important subjects connected with the practice of medicine, from the fact that all general practitioners practice it; and, important as it is, it is important that we be posted upon any part of the art that may come up. The use of the forceps is the most important operation connected with the obstetric art, for the reason that it is conservative of both mother and child. Just when to use the forceps is always a debatable question. I think in a natural case of labor with the head low down in the vagina and the presentation natural, as it would be there, and with feeble pains, that we would be justified in using the forceps in a half hour's time if there is no progress. The low operation, comparatively speaking, is a minor one and an easy one to employ. The high operation must always be regarded as a major one, and it requires the utmost judgment and skill on the part of the operator.

The question comes up sometimes whether the physician would be justified in using the forceps to save his own time. Generally speaking, he would not; in rarely exceptional cases, possibly, yes. The important thing in the use of the forceps is cleanliness, and it should apply to the operator, to the instruments, to the nurse and to the mother. It is a very interesting subject and one that should be discussed here.

As to the application of the forceps, there can be no question of the advantages of the cephalic application in certain cases. When

the head is low down the pelvic application is made on account of the position. When the head is high up under the brim we can only apply them in relation to the pelvis. If the head is started down they may be removed and reapplied.

Dr. C. C. Terry, of South Bend: I do not think there is any place or time in which the physician is more expected to deliver the goods than in obstetrics, and nothing else has had as little progress. I am unable to see why a case should go on with even a moderate degree of progress when the instruments save the mother and child. It is the pressure that causes the danger in these cases, not only to the mother but to the child. The pressure produces sloughing and necrosis, and in the case of the child where trouble is had it is usually due to meningeal hemorrhage, that if they live dooms these children to a life of idiocy. A number of these cases have been reported and the forceps are understood to be the cause, and it is also the lack of forceps and continued labors that make it. I do not see why the forceps should be used as a last resort any more than that surgery should be used as a last resort in appendicitis.

In regard to catching the membranes between the sides of the head and the forceps: this will oftentimes detach the placenta before delivery. I have had one such case. It can be detected by the hemorrhage that occurs immediately upon the delivery of the head. Such hemorrhage is quite free and means the death of the child and indicates this trouble. Personally, I believe the percentage of infections and of lacerations is smaller with the forceps than without, as you can control the matter of lacerations. Instead of having the limbs flexed as is usually done in delivery it is better to have them extended. It makes a difference in the perineal muscles and extends the sacrum and relieves resistance. As to anesthesia, I think the horror of the mother and the laity is produced by the lack of complete surgical anesthesia. The patients always bear anesthesia well. The danger is small. I believe it should be given by a competent man, but oftentimes I have the husband or some one give it, and I have had no deaths from anesthesia. In regard to the use of the forceps to save the physician's time, I do not think it justifiable. But from a humanitarian standpoint they should be used even more than they are.

Dr. Lee, of Indianapolis: I think I can differ with the discussionists in saying the forceps should not be used to save the time of the doctor. I had at one time in the country two cases one-quarter of a mile from each other at the same time, and it was absolutely impossible to obtain but one doctor, and I was the doctor. One was a primipara and the other a multipara. I saw no reason why I should not save some time, and I put on the forceps and delivered the first case and succeeded in getting to the house where the other one lived. She was delivered and was having post partum hemorrhage. I think quite likely she would have died if I had not used the forceps in the first case. That is an extreme case. Quite a number of times I have had cases in which the use of the forceps became necessary where it was impossible to obtain an assistant in time, and I have used the anesthetic (and I would emphasize complete anesthesia) and then entrusted it to some assistant about the house until I could do a forceps delivery. I commend the essayist on the thoroughness with which he handled the subject, and call attention to the fact that a great many operations necessary upon women are due to the improper use of the forceps at the time of labor, or neglect to use them.

Dr. Case, of Attica: Among the cases where I have used the forceps and had the most difficulty have been those of occiput to the rear where the head did not engage, and by manipulation I was unable to make a change in the position and hold it there. The application of the forceps with the occiput to the rear, I presume, is familiar to all of you. I think it can be done by pulling the head through the perineum, but I think it is rarely possible to do it without. I think I can diagnose a case that I am compelled to use the forceps early in the case. The patient will be extremely nervous and hard to control, does not bear pain well and makes a great deal of complaint. I believe in these cases the occiput is to the rear. The head does not engage although dilatation is complete. My method has been in the last few years to change the position of the head by passing the hand into the uterus, turn the occiput to the front and hold it in place and with the other hand apply the forceps. There is no trouble after getting the forceps on, and I have succeeded in making easy delivery of these cases. In regard to anesthesia, I have found if

it has been continued for a long time there is a liability to hemorrhage. I have learned to avoid that as much as possible, and withdraw the anesthetic as early in the case as possible.

Dr. Young, of Valparaiso: To those who think obstetrics a picnic I want to relate one case that illustrates the difficulties a man sometimes finds himself in in these cases. I was called to see a primipara after she had been in labor about thirty-six hours. The physician who had been called had made several visits and finally told them to get someone else. The woman was practically exhausted, the pains were very feeble and the conditions surrounding the patient were the worst imaginable. The room was absolutely filthy, and just large enough for the bed and for me to work on one side. No progress was being made, but I could not determine the exact cause. The head was rather low down and was not large, but didn't move, so I determined to apply the forceps. I sent for the physician, who was too busy to come, and who was at home asleep. I sent for him to give the anesthetic, at 1 o'clock in the morning, and thus I got even with him. After the delivery, which was not at all difficult, I discovered we had a case of twins, and the delay was due to the fact that the head of one child had locked with the head of the other just above the shoulder, so that the two entered the pelvis at the same time. I soon succeeded in delivering the other without instruments. Both babies were blue and neither breathed for ten or fifteen minutes and required the attention of one of us. In the meantime the woman was having hemorrhage. Following this operation the mother developed a mild grade of sepsis, and to cap the climax, after working with the case for about ten days as I never worked before, they threatened to sue me for malpractice.

Dr. C. J. Cook: The application of the forceps, as we all know, is a serious matter, but I have practiced obstetrics a great deal in the country and I think we should have more to say about the force and method used in traction where the forceps have been applied without a proper knowledge of the anatomy of the pelvis. I think if we would give that more thought we would save injury to the mother and save the offspring.

Dr. Wright: Nothing has been said in regard to those cases where the head is above the pelvic brim. I think nothing has been said as to the necessity of Caesarean section is these cases. The death rate, as the paper has said, is very high in applying the forceps in these high positions, and the question comes to the mind of the obstetrician which is the safest to the mother and child, going ahead and undertaking to deliver by the forceps or some other means, or by Caesarean section. In these days of abdominal surgery, where a surgeon can be had in almost any part of the state, that question has become more important than it has been in the past, and I am inclined to think that we sacrifice the mother and child oftentimes by too long manipulation with the forceps in these cases.

Dr. B. VanSweringen, of Fort Wayne: It seems to me the question of the desirability of applying the forceps is one that should be decided upon examination in each individual case, and for reasons that are peculiar to the individual case. I have delivered some occipital posterior positions by the forceps in which, after delivery was accomplished, I have thought it would have been much better to employ Caesarean section, on account of the fact that the child was lost and the mother very greatly injured, and I am still of that opinion, that many of these posterior positions are, as Dr. Wright has suggested, better treated by Caesarean section than by delivery with the forceps.

One gentleman who discussed the paper, in speaking of posterior positions, made reference to the plan of changing the position of the head by introducing the hand into the uterus and changing the position of the whole body, converting it into an occiput anterior. I have employed this method in two cases with considerable success, and that may be all that is necessary; that is to say, a delivery which would be very difficult by the employment of that procedure may be converted into one of comparative simplicity. But it is my custom to reserve judgment at the beginning of delivery until the case progresses and then employ such means as seem best fitted to the individual case. One should not go into a case with the idea that the forceps is the best method of accomplishing the delivery, because it may be best accomplished by podalic version. After some experiences I recall with the for-

ceps in posterior positions I am led to believe that Caesarean section appears to me as being the best procedure.

Dr. Edwin Walker: Since the last speaker considered the question of Caesarean section I thought it might be opportune to report one case. I was called to see a lady in labor, attended by two most excellent physicians. They had tried to do a version and apply the forceps, but had not succeeded. The reason was that the woman had formerly been operated on and one ovary removed and some adhesions existed which caused the uterus to rotate with each pain, so that the direction was toward the left ilium. I did not attempt to apply the forceps or turn because both of them had tried it, and they had had more experience in that line than I, so we decided as six hours had elapsed that Caesarean section was indicated. The patient was removed to the hospital and the operation done in a very few minutes. The child was delivered and lived twenty-four hours, and died, as I am satisfied, from the long labor to which it had been subjected; had the operation been done sooner I have no doubt the child would be living. The mother made an uninterrupted recovery. I think the position is well taken by the last two speakers. Rather than by the use of the forceps or prolonged manipulation by turning Caesarean section should be used. Dr. Zinke has written several papers advocating section for placenta previa, and there are undoubtedly cases where the mortality would be less by Caesarean section than by the use of the forceps.

Dr. G. T. McCoy: I will not take time to answer all the points, but there is one brought up as to the time element. It is our duty to relieve suffering in any way we can, if we can do it without doing some other damage, and as I said in the paper, other things being equal, the shorter the labor the better it is for the child. As to the use of the forceps, version or laparotomy, that should be governed a great deal by the skill of the operator; each case is a law unto itself. Some men become very expert in obstetrical manipulations. To some turning is an easy thing to do. To others it is difficult. Others become skillful in the use of the forceps, and whichever operation seems to promise best to the individual operator after taking into consideration the mother and child both, that is the operation which should receive the

preference. As to which is preferable at the superior strait, version or the forceps, I think it will be a good many years before that is settled. I prefer version. I acknowledge I have not brought anything before the society but what you all know, but the uncommonness of the subject in our state meetings is sufficient apology.

THE CALORIMETRIC PRINCIPLE IN INFANT FEEDING.

BY G. B. JACKSON, M. D., OF INDIANAPOLIS.

The calorimetric measure in dietetics is not a new idea. Any and all of our text-books upon diet or physiology treat of the subject in relation to all phases of the adult body.

It was, however, comparatively recently that Professor Heubner[1] established its place and pointed out its usefulness in infant dietetics.

The Calorie, as we all know, is the power required to raise one kilo of water from 0 to 1 degree Centigrade. It is the common quality or factor in all classes of foods, and, therefore, the basis of expression of their physiologic value. After careful clinical observation and laboratory estimation of the metabolism of normal breast-fed infants Professor Heubner concluded that the ratio between the body weight and food intake in twenty-four hours was constant at a given age. This ratio, designated by Heubner energy quotient, he found to be 100 Calories to one kilogram of body weight in twenty-four hours in the first six months, and gradually diminishing to about eighty Calories at one year of age.

In artificial feeding the ratio is about 10 per cent higher than in breast feeding, due, we believe, to the increase in expenditure of energy in restlessness and digestive activity.

W. Camerer[2] gives us the following table which represents the consensus of opinion of most clinicians as to the correct quotient in artificial feeding:

CHART I.

Age	
1st ¼ year	110 Ca. to 1 Kilo w'g't. in 24 hours.
2nd ¼ year	100 Ca. to 1 Kilo w'g't. in 24 hours.
3rd ¼ year	90 Ca. to 1 Kilo w'g't. in 24 hours.

or, reduced to our system,

50 Ca. to 1 lb.
45 Ca. to 1 lb.
40 Ca. to 1 lb., etc.

1. O. Heubner. Handbuch der Kinder Heilkunde and Zeitschrift fur Physikal. und diatet. Therapie Bv Hl.
2. W. Camerer. "Stoffwechsel und Ernahrung im ersten Lebensjahr" im Handbuch der Kinder Heilkunde, Pfaundler und Schlossman.

We note a diminution of ten calories, about 10 per cent. per quarter year of age. This variation is parallel with that of the body surface and body weight quotient as seen in Chart II (modified from Camerer).

CHART II.

Body Surface.	Birth	10 wk.	22 wk.	1 yr.	Adult
Sq. dcm. to Kilo w'g't.....	8.3	7.	6.3	5.3	3.
Energy quotient Cal. to Kilo of w'g't	110.	100.	90.	75.	40.

This observation I consider a good point in favor of the accuracy of the energy quotient, considering the fact that about 85 per cent. of the body heat in infancy is eliminated by the skin.

The following quotations from the more recent observations of a few clinicians I desire to present, making no attempt to exhaust the literature upon the subject.

E. Feer[3] reports his observations upon one of his own children with complete estimates of the quotient during the entire period of forty-six weeks from birth. For the first twenty-three weeks there was exclusively breast feeding, with mixed feeding during the following ten weeks and artificial feeding from the thirty-third to the forty-sixth weeks inclusively. This latter was accomplished by using simple milk dilutions with cereal waters in amount averaging 96 Ca. to the kilogram of weight in twenty-four hours, the child gaining an average of three ounces per week with "perfect contentment and health."

One of Feer's earlier observations[4] upon one of his children breast fed from the third to twentieth weeks is shown in Chart III, prepared by the writer from the text of Heubner.

CHART III.

Week	Gms. Milk	W'g't	E. Q.	
3.	550	3900	100	ca. : Kilo.
4.	610	4000	105	
6.	750	4400	120	109 = average for 1st 3 mos.
8.	810	4600	120	
10.	800	5100	109	
12.	800	5500	101	
14.	840	5700	101	
16.	840	6100	95	97.2 Ca. average in 4th and 5th mos.
18.	890	6400	97	
20.	920	6700	96	

3. E. Feer. "Nahrungsmengen eines Gesunden Brustkindes und Energieverbrauch desselben nach der Entwohnung," Jahrb. f. kindhk. '06.
4. O. Heubner Handbuch. Vol. I, P. 36.

These figures correspond very closely to those of Finkelstein, Prausnitz and others cited by Feer.

W. Camerer says: "If a child does not thrive in spite of an apparently normal energy quotient the milk will be found poorer than normal, especially in fats, while if the child thrives upon an apparently low energy quotient the milk is usually highly potent in fats.

The writer believes that experience will bear out this statement, and that chemical analysis of the milk or the use of certified or mixed herd milk offers the best control of the situation.

A. Mayer[5] says, in treating of the recent advances in therapy of gastro-intestinal disorders, that "in every case we should be careful not to allow more nourishment than 100 Ca. to kilo in twenty-four hours as per Heubner's observations."

C. Brehmer[6] uses this standard in his work with buttermilk and finds his energy quotient 100 to kilo, and patients "doing nicely."

Koeppe,[7] with reports of many cases, concludes that "Heubner's energy quotient is an indispensable aid in prescribing."

The writer heartily agrees with these observations after having employed the method constantly for two years with what he believes to have been good results, having reduced the method to a working basis with the American feeding methods.

We know that the value of one gram of carbohydrate or proteid matter is 4.1 Ca. and of fat is 9.3 Ca.

If we desire to use the percentage method of feeding we apply the calculation as follows (using a hypothetical case of an infant weighing 9¾ pounds, and in the first three or four months of life):

CHART IV.

℞ Fat 2.5 per cent.	Sugar 6.5	P. t. d. 1.25
Factor=9.3	4.1	4.1
Am't=23.25 Ca.	26.25 Ca.	5.125 Ca. in 100 cc.

Total = 55 Ca. in 100 cc. or 550 Ca. in 1 liter.

1 Quart = 94 per cent. of 1 liter or 520 Ca.

9¾ lbs. × 50 Ca. = 487 Ca. = Child's need.

$\frac{487}{520}$ of 1 quart = 30 oz.

5. A. Mayer. "Die Fortschritte in der Pathologie und Therapie der Kindlichen Verdauungs Organe in den Jahren 1900-1903." Goettingen '05. (Vandenhoek u. Ruprecht.)
6. Carl Brehmer Jahrbuch fur Kinderhk. Bd. 63, June 11, '06.
7. Hans Koeppe Jahrbuch fur Kinderheilk. B 63, '06, H 6.

A simpler means of calculating—and to this I desire to call especial attention—is that of using factors 4, 4 and 9 without the decimal parts and calling the result a quart, thus:

F. 2.5	S. 6.5	P. 1.25
9	4	4
22.50	26.00	5 00

Total 53.5 or 535 Ca. in a quart.

The error is not more than 2 per cent., which may be ignored.

In ordinary methods other than the percentage plan the following table is of use:

TABLE V.

Whole Milk (cow or human)	660 Ca. to quart
Buttermilk	330 " " "
Whey	330 " " "
Condensed Milk (Eagle)	94 " "ounce
Carbohydrate Flour, Oatmeal, Rice Flour, Barley Flour, Wheat Flour	100–110 Ca. to 1 oz. w'g't
Sugar	120 Ca. to ounce

Spoonful equivalents are:

One level teaspoon equals 1½ dram, 3 gm. wgt.
One level dessert spoon equals 3 dram (measure), 6 gm. wgt.
One level tablespoon equals 5 dram, 10 gm. wgt.
Heaping spoons are twice the amount of level ones.
Three level or two ordinarily full tablespoons equal one oz. wgt.

The writer believes the simple dilutions of whole fresh milk with water or cereal solutions give better results and more constant satisfaction because of the ease and simplicity of prescribing and preparing them.

The addition of sugar up to 7 per cent.—never more—is advantageous in that it adds to the food concentration and thus reduces the volume of fluid ingestion which often harms the kidneys and circulatory system by overworking them, as well as producing oversweating.

The following table (VI) shows the solutions in use in the Charite Kinderklinik of Berlin (Heubner's) and the very simple factors in calculating the daily feedings:

CHART VI.

		P'td.	Fat.	Sugar.	
1.	"1/3 Milk"	1%	1.2%	1.5%	
	2/3 Sug. Sol. 8°/₀			5.3	
		1	1.2	6.8	=400 Ca. to qt.
					12 1/2 Ca. to oz.
					∴ 4 oz.=50 Ca. ∴ factor 4
2.	"1/2 M."	1.5	1.8	2.2	
	1/2 ss 10 °/₀			5.	
		1.5	1.8	7.2	=500 Ca. to qt.
					15 Ca. to oz.
					∴ 3 oz. = 45 Ca. ∴ factor 3
3.	"2/3 M"	1.8(2)2.4		3.	
	1/3 ss. 12 °/₀			4.	
		1.8(2)2.4		7.	=600 Ca. to qt.
					18 Ca. to oz.
					∴ 2 1/2 oz.=45 Ca. ∴ factor 2 1/2
4.	Whole Milk	3.3	3.4	4.5	=600 to qt.
	(undiluted)				29 to oz.
					∴ 2 oz.=40 Ca. ∴ factor 2

Using these factors we may construct a table which will graphically illustrate the dependence of the principle upon—and its variation with—the age and size of the individual, thus:

TABLE VII.

Age 2 Wks. Solution "1/3 Milk" Weight, Factor 4, Am't		6 Wks. "1/2 Milk" Factor 3	12 Wks. "2/3 Milk" Factor 2 1/2	36 Wks. Whole M. Factor 2
6 lbs. × 4	24 oz.	18 oz.	15 oz.	12 oz.
7 lbs. × 4	28 oz.	21 oz.	17½ oz.	14 oz.
8 lbs. × 4	32 oz.	24 oz.	20 oz.	16 oz.
9 lbs. × 4	36 oz.	27 oz.	22½ oz.	18 oz.
10 lbs. × 4	40 oz.	30 oz.	25 oz.	20 oz.
11 lbs. ×	oz.	33 oz.	27 ol.	22 oz.

In changing from a weaker to a more potent solution it is well to do so gradually, and it has been my practice to add an ounce of milk to the twenty-four hours' quantity and subtract an equal amount of the diluent for a gain in weight of 6-8 ounces until the next regular solution is reached.

The writer hopes that the frequent charts of many figures have not been confusing or discouraging, as they are purely illustrative and not necessary to be memorized in order to apply the truths of the principle.

In the percentage system we need only to remember factors 4, 4 and 9 (or 40, 40 and 90) in order to ascertain the caloric worth of one quart of the food.

In the simple dilution plan we need only remember the solutions one-third, one-half or two-thirds milk with sugar to 7 per cent. and the factors 4, 3, 2½.

The accuracy of the quantitative estimation in contrast to our former tables, with their variation of from 30 per cent. to 100 per cent. without explanation, reason or suggestion for guidance, the ease of its application to any and all feedings, and the scientific basis for its use lead the writer to conclude with the expressed desire to have at least stimulated an interest which may lead to a fair trial of the method in our practice.

INFANT FEEDING DURING FIRST YEAR.

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There is no part of the practice among infants which is as important as feeding. Every physician should understand the principles of feeding, the composition of milk and how to change it to suit the case, whether mother's milk or other milk. Many of the deformities of early life, such as bow legs and backwardness in teething and walking, poor digestion, weakness of constitution and a tendency to sickness in general, are the results of improper feeding during infancy. Every mother would have her baby be strong and rugged, and would do anything in her power to insure these results, but how is she to know how to encompass this end? The information she needs should come from the doctor, from one who is trained on the subject, and not from well-meaning friends who have not had the opportunity to study the modern scientific methods or from the druggist who has all kinds of proprietary foods for sale.

The proprietary food people are feeding a great many, I might say the most, of the babies today that are not breast fed, and they will continue to do so if the doctor does not reclaim this part of his business, for it is the business of the physician to prescribe what the infant should eat.

I do not believe we are paying enough attention to this important field of practice. I heard of a case not long ago of a new born baby who was not thriving on the mother's milk. She asked the doctor about it. He replied that he did not know what the trouble was, but advised her to get some Horlick's malted milk and try it. Do you wonder that people are using these proprietary nostrums or foods when the doctor treats it so lightly as that. It is not only difficult to master the subject of infant feeding, but requires study and experience to carry it out successfully.

Though great advances have been made in the last decade in the study of infant feeding, still the art of applying certain prin-

ciples to the feeding of infants has not attained its highest perfection. To a certain extent the subject of infant feeding is still empirical, although empiricism is gradually but surely disappearing from the field of pediatrics. It is the exceptional infant today that refuses to thrive and puzzles the most brilliant master of the art, but the majority of infants can be fed according to principles well established and laid out at our disposal.

In considering the subject of infant feeding it naturally divides itself into the natural or breast feeding and artificial, or a substitute for breast milk, such as cow's milk or infant's food or a dilution of the same.. I will first take up breast milk, giving its composition, and in turn will compare the other foods with it. Foods of animals and human beings are divided by chemists into five great divisions—fats, carbohydrates, proteids, mineral matter and water, and the differences of foods is caused by a different proportion of these elements. Breast milk varies not only in different women at various periods of lactation, but in the same woman at different times of the day. The result is that various analyses differ but at the same time agree within certain limits.

Many analyses of human milk show it usually to contain 3 to 5 per cent. fat; proteids, 1 to 2 per cent; sugar, 6 to 7 per cent. Undoubtedly there is constant changing and variation in these percentages within certain limits from day to day, and even from hour to hour, but the infant usually adapts itself to these variations. The variations are usually in the fats and proteids, the sugar remaining quite constant in quantity.

After the mother has sufficiently rested from the labor the baby should be put to each nipple. If this does not satisfy and the infant becomes fretful a teaspoonful of boiled water may be given. This not only quiets the infant but helps wash out the digestive tract and kidneys. Sometimes the milk is slow in forming, so we should not be too ready to think that the mother is not going to be able to nourish her infant. If there is not enough at first a little modified milk according to correct formulas may be given, with hope that the mother's milk will increase. That the infant does not always want milk when it cries is a fact that we should impress on mothers and nurses. Sometimes it is water that it wants, and it should be given freely to young infants. We should also impress on the mother the importance of regular-

ity in the time of nursing, and that she will not let the baby nurse every few minutes or half hour. I saw an infant not long ago that its parents thought was sick, that was only overfed. When the time of eating was properly regulated the infant was quiet.

The diet of the mother is very important. She should have a substantial and mixed diet, but not too different from the diet that she is accustomed to. If her milk does not seem to satisfy the baby; if, after the little details have been looked after, it is clinging to the breast for half an hour and still unsatisfied, or if the baby does not gain in weight the milk should be examined, and if the mother is not secreting enough or too weak in quality we should endeavor to do all in our power to improve it, giving a diet rich in fat and proteids, with plenty of liquids, and regulating the mother's exercise.

See that she is getting plenty of fresh air and is not worrying or fretting. Regulate her bowels if possible through the diet. If these details are carried out the milk will usually improve. On the other hand, if the baby throws up its milk or frets and has the colic a great deal the doctor should also look into the milk and examine it. It is probably too rich in fat and proteids or the baby is getting too much. In this case, as before, the mother's diet should be looked after; the proteids and fats should be cut down; she should take more exercise and use up some of the surplus herself. Sometimes administering saline cathartics will decrease the milk in quality and quantity, but this may act too freely on the baby.

In regard to examining the mother's milk, if it is not possible to have a complete analysis made, and this is not necessary, there are devices at our hands that every physician can make sufficient tests in his office to give satisfactory results. A Marchanes tube is all that is necessary to test the fats, and it can be done in a few minutes. As to the proteids, it is not possible to examine them in the office, only the gross proteids.

The following is the method of Woodward: Two milk burretts, each containing 5 c. c. of milk, and allowed to stand over night in a warm place 100° F. They are then cooled. The milk is drawn off into two Esbach's tubes and 10 c. c. of Esbach's solution added. Shake tubes, put into centrifuge and rotate till reading is constant. If after trying to improve the mother's milk

the infant does not gain, or if the mother has consumption or syphilis the physician will have to resort to some other food, or if the mother has an acute disease, as pneumonia, typhoid, etc., there will have to be a change, at least for a while. Sometimes during menstruation of a mother it is necessary to resort to some other food: also during pregnancy.

When it becomes impossible to supply an infant with its mother's milk from the above contradictions or others recourse must be made to some substitute. How shall we do this? Shall we tell the mother to try every kind of food suggested by her kind friends until one is found that agrees, or shall we resort to scientific modifying of cow's milk? A. V. Meigs, of Philadelphia, made the first attempt at scientific infant feeding by adjusting cow's milk so that it would resemble woman's milk in composition. Later Rotch, of Boston, emphasized the importance of systematic percentage feeding, which consists of trying to make from cow's milk a mixture that contains accurate percentage of fat, proteids, carbohydrates, mineral matter and water. Other workers have contributed their quota to the advancement of scientific infant feeding, with the result that many formerly accepted beliefs and doctrines have been modified and completely abandoned.

At present it is not accepted that there is one and only one way of scientifically feeding an infant. While there may be differences of opinion as to methods of feeding, there are certain principles involved which are beyond dispute and about which there can be but one opinion. In preparing an artificial food for infants nature should be followed as closely as possible. It should compare with human milk in its nutritive value, which is determined by chemical analysis, in physiological properties or its behavior on the digestive tract and in the manner and condition in which it is supplied to the infant. None of the lower animals furnish milk that approximates human milk in physiological properties even after the percentage of fat, proteids and sugar has been adjusted to equal that of human milk. Therefore it should always be kept in mind that anything aside from breast milk that is put into an infant's stomach is a foreign substance that may cause digestive disturbances. This is one of the fundamental principles of infant feeding.

Though nutrition and development of the digestive tract should be considered together, nutrition comes first, and in cases of poor digestion it is justifiable to use anything that will sustain the infant until normal digestion is re-established; then the food should be changed so as to cause proper development. Many feel that after something that agrees and causes gain in weight is found the problem of successful feeding has been solved, but the future of the infant may be completely wrecked by such a method of feeding. For instance, an infant is receiving as much fat and sugar as is found in human milk and one and one-fourth as much proteids. The infant is fat and gaining in weight, and to all appearances healthy; yet it can be predicted with reasonable certainty that this infant will become rachitic or succumb to the first illness, as resisting force comes from the proteid. Rickets is the result of giving food deficient in blood and tissue building elements.

Animals that grow rapidly need milk rich in proteids and mineral matter for the bones, and we find that a calf, which grows very much faster than a baby, receives milk from the cow which is about twice as rich in proteids and mineral matter as the milk the baby naturally receives. It has been found that the milk of all animals not only develops the stomachs of the young but also contains the food elements in proportions suited to the rapidity of the growth of their offspring. It is easy to see why cow's milk does not suit infants without modification, since it contains fat about 4 per cent., proteids, 4 per cent., and sugar, 4 per cent.

The curd formed from cow's milk is much coarser and tougher than the curd of human milk. This is accounted for from the fact that cow's milk was intended for the calf, an animal much larger, with a larger stomach, capable of digesting larger curds. Most of the digestion takes place in the calf's stomach, while in the infant about nine-tenths of its digestion takes place in the intestines. Therefore it is easily seen that the large curds from cow's milk may cause trouble in the delicate stomach of the infant. If cow's milk is to be the basis of our infant's food, and since it is not proper, how are we to change it?

The older methods of modifying milk consisted of adding some alkali or lime water or soda, which prevents the stomach secretion acting readily on the milk, which then easily passes into the

intestines; but it is believed today that the action of the stomach should not be retarded, but its use should be encouraged as much as possible, and only add chemicals to the food when the digestive secretions are abnormal.

It has been found by experiment that the secretion of the stomach juices is naturally brought about by absorption of the product derived by the action of the saliva of the mouth on the food. Now saliva partially digests the carbohydrates of bread, potatoes and cereals, so in preparing infant's food partially digested cereals should be used, which bring about a natural secretion of the digestive juices, and also when mixed with cow's milk the curds become loose and more like the curds of human milk. These mixtures are not as good as breast milk, but are much in advance of any other mixtures that have been suggested. The modified curds of cow's milk develop the stomach and furnish proteid; the digested gruels produce a natural secretion of the digestive juice and also furnish proteid and a carbohydrate which the infant is prepared to assimilate. So there is no danger of the infant forming too little blood, bone and muscle.

When it is possible get from a reliable milk man the mixed milk of several cows that has been cooled and put in regular quart bottles soon after milking. If this is done there will be a layer of cream at the top of the milk. The character of the milk is greatly changed if the cow becomes frightened, nervous or sick. So that the chance of securing a natural milk of one cow is not so good as mixed.

Cooling the milk prevents bacterial growth and souring. Milk does not change much in cold weather. Bottled milk is best because it is not opened from the time it leaves the dairy until it reaches the home, so there is little chance for disease germs to get into it.

Infants digest the fat and carbohydrates of cow's milk without difficulty, but have trouble with the proteids. But remember the proteid is twice as much or more in cow's milk as in human milk; besides the curd is larger and tougher. So cow's milk should be diluted to reduce the proteids. Gruels made from barley or other cereals, mixed with cow's milk, have a tendency to break up the curds and make them smaller and more like woman's curds. So instead of using water to dilute the proteids a gruel

will suffice for this, and at the same time modify the nature of the curds so they will be more easily digested. These gruels are made by mixing a tablespoonful of barley flour with a little cold water, enough to make a paste: then add hot water and boil in a double boiler for about fifteen minutes; let it cool; then add a pinch of salt. Then add a little diastase to digest the starch, and after the gruel becomes thin, strain through a fine cloth. Some writers claim, however, that the gruels do not need digestion and act as well without, but I prefer to digest them up to eight or nine months. Oatmeal gruel is made by using oatmeal flour instead of barley flour. Rolled oats may be used, taking two heaping tablespoonfuls. This is better if baby is constipated. Wheat flour may be used the same as barley flour if baby has diarrhoea. These gruels should be made fresh each day.

The dilution reduces the fat and carbohydrates to below what they should be. So these must be added. Cream, which contains a large amount of fat, at one time was added, but the method was difficult to follow. A better method has been worked out by Chapin, of New York, and is now generally followed.

The top milk is removed and mixed thoroughly. It contains the cream and part of the milk. The fat is greater in the first ounce on top of the bottle, and the top milk contains more fat than the lower or whole milk. For example, the top nine ounces of very rich milk will be about 16 per cent. fat, of rich milk about 10 to 12 per cent. fat, of thin milk about 9 per cent. fat.

The top sixteen ounces of very rich milk will be about 9 per cent. fat, of rich milk about 8 per cent fat, of thin milk about 6 per cent. fat. The proteids and carbohydrates do not vary much in the top milk from the whole milk; thus the top ounce which is about 25 per cent. fat is 4 per cent. proteids.

It is very easy to modify a top milk so that it contains the proper proportion of fat proteids and sugar. For instance, if one wants to feed a month old infant such an infant would require a food about 3 per cent. fat, 1 per cent. proteids and 6 per cent. sugar, and about twenty-five ounces for a day's feeding. For this mixture the nine-ounce top milk should be used, which is 12 per cent. fat; diluting it four times would give a milk 3 per cent. fat, 1 per cent. proteids and 1 per cent. sugar. Add about one ounce of either granulated or milk sugar and we will have the correct food.

Take a four-month-old infant. It would need about forty ounces of milk 3 per cent. fat, 1½ per cent. proteids and 5 to 6 per cent. sugar. For this mixture the sixteen-ounce top milk, which is 8 per cent. fat, 4 per cent. proteids, is easily modified by taking fifteen ounces top milk, twenty-five ounces diluent to 1½ ounces sugar. For a nine-month-old infant we would use the sixteen-ounce top milk, and it will need a 4 per cent. fat and 2 per cent. proteids. This would require twenty-four ounces top milk, twenty-four ounces diluent to two ounces sugar. This would necessitate using two bottles of milk.

These formulas are very easily worked out. First determine the amount of modified milk that is required for a day, then the per cent. of fat and proteids required. Then take the per cent. of fat required for the numerator and the per cent. of fat in top milk for the denominator, and this fractional part of the amount of diluted milk will give you the amount of top milk required. To illustrate, if you wish to fix a mixture of twenty-four ounces of 1 per cent. fat and .33 per cent. proteids the fraction would be 1-12 of twenty-four ounces, or two ounces of top milk. Or if for an older baby you wish to mix thirty-two ounces of food with fats and proteids two to one, with 3 per cent. fat, 1½ per cent. proteids, the fraction would be ⅜, and the amount of top milk would be ⅜ of thirty-two, or twelve ounces.

After receiving the milk from the dairy place it in a cool place below 50° F. and let it stand for three hours, until the cream has raised to the top of the bottle. Pour off, or, better, dip the top milk and add the required amount of diluent. The sugar is then added, either milk sugar or granulated sugar, one ounce to each twenty ounces of modified milk. The milk should then be poured into the nursing bottles, enough in each bottle for one nursing, and the bottles stopped with absorbent cotton. Place them in the refrigerator until ready for nursing. This process if carried out carefully and illustrated to the mother or nurse will be easily understood. I have been using it for two years and have not yet found a mother who could not follow it. It is true that no one formula will suit all babies of the same age, but with four or five formulas most well babies can be fed.

Commence with the formula with fat and proteids that the age would indicate, then increase as baby's condition indicates, keep-

ing a close watch on its weight. Give the mother a weight chart and have her weigh it each week. Have her also to watch the stools, and if there is anything abnormal, to report. Insist on seeing the baby at least once a month. Do not depend altogether on the parent's report. Examine the weight chart. At the first indication that the baby is not doing well examine the milk.

In feeding a sick baby with gastro-intestinal trouble with modified milk we should commence with a very low mixture of fat and proteids and increase cautiously, leaving off the milk entirely until the digestive tract is empty, especially if there is bacterial infection. The normal infant stool is smooth, yellow, homogeneous and about the consistency of thin mush. Curdy lumps may consist of undigested casein or fat. The former are hard and yellowish, while the latter are soft and smooth like butter. Green stools are thought to be due to fermentation, and are the result of bacterial action. Certain drugs cause green stools, and they also become green after passage by oxidation of the air. Slimy or mucous stools are the result of catarrhal inflammation. When the mucous is mixed with fecal matter the irritation is high up in the bowels, but when flakes or masses of mucous are passed the trouble is near the outlet. If, after giving a very low percentage of fats and proteids, the baby does not improve leave off the milk entirely for twenty-four to forty-eight hours, giving the gruel instead. When the trouble abates commence with a low percentage and increase cautiously until the proper percentage is reached. If the baby's stools indicate infection inquire into the milk supply and see if it is not at fault; also examine it as to percentage, for with frequent greenish movements, with colicky pains, the proteids are likely at fault. If the baby is constipated the fat may be too low and should be increased.

I have not resorted to artificial infant foods in feeding babies except to tide over for a few days when one is traveling. Or sometimes a mixture of condensed milk and cow's milk agrees in a sick baby when the other formulas have failed. A great many of the infant foods are nothing but a dextrinized cereal to be mixed with milk. I see no advantage in these, and they are more expensive than barley or oatmeal flour. Others are dried milk, which one at a glance can see are dangerous articles of food for a prolonged period without some fresh article of diet. The pepto-

genic milk powder of Fairchild's would assist in modifying the casein if the proper proportions are used, but according to their directions the fats and proteids are entirely too high for a young baby.

I have found Imperial Granum, which is a prepared cereal, agreeable in cases of ileocolitis, more pleasant to take than a plain cereal. Mellin's Malted Milk is a malted or a cereal food, containing some diastase, which acts as the digested gruels, but it has no advantage over dextrinized gruels and is more expensive. In summing up, then, I will say that I would insist on breast feeding whenever it is possible, for there is no food so well adapted to infants as mother's milk. But whenever contraindicated, I would not endanger the life of the mother or child by letting it nurse.

I believe that with proper modified milk any baby can be successfully fed and grow to be a healthy child without rickets or any other constitutional trouble or deformities; that the important things in infant feeding are:

First—Getting a good, clean milk with few bacteria, cooled down at once to prevent bacterial growth.

Second—To know whether it is a very rich, a rich or a thin milk.

Third—To know the principle of modifying milk.

Fourth—To not use a strong percentage to start with, but a low one, and increase cautiously.

Fifth—To know the symptoms of indigestion, both of fats and proteids, and how to change the milk to relieve them.

The time is coming, I believe, when we will receive better milk. Our health boards and city officials and legislators are inquiring into the food we get and are placing restrictions over the dairymen. We are also studying the milk itself and learning more of its nature. That good milk can not be obtained, I find, is the most frequent objection to feeding modified milk, but we must insist that, if it is some trouble, the importance of proper feeding overbalances the trouble; that if we want strong shildren they must be properly fed. The medical profession should do all in its power to improve the milk supply.

Dr. Hoskins: In view of the fact that the chairman has promised you that we would adjourn promptly at twelve, I will dispense with my discussion of this subject.

Dr. J. A. Work, of Elkhart: The last essayist has given us a few things that should be in the system of baby feeding. To my mind there is not a question that is more puzzling than this question of baby feeding. It is very unfortunate for any baby not to have its natural food. I believe that the Almighty created babies and sent them into this world, and he sends food with them, as a rule, and he sends just the right kind for the baby to have, and I think that in order to have the baby well fed we should go back for two or three generations of healthy mothers, for a healthy mother can give a baby just the right kind of food, and give it just at the proper time. And certainly we find the mother's milk from a healthy mother just exactly right; it is sterilized thoroughly when the baby gets it from the breast, for that is the natural way and is much better than any artificial way. It is hard to get milk as fresh from the cow, but we do not have any other food at our command. After we find a healthy cow, how shall we procure the milk? Some think it is better to get mixed milk from the milk man, and the best way is to have a bottle for each feeding. These bottles should be thoroughly sterilized before the milk is put therein. They should then be taken to the dairy and the milk milked directly into them from the teat; if you handle the milk you will spoil it; it should be milked directly into the bottle and corked up, and when you go to feed the baby shake it up, and if it is found not to be rich enough give it some of what we call the strippings. When you want to feed the child put the bottle in warm water and warm it to the desired temperature.

Dr. Jackson, of Indianapolis: The object of my paper was not to discuss the different methods of feeding the baby, but I took it for granted that we had before us a baby which had to be fed, and then the next question was as to what we should feed it, and by what method. Of course, we wanted the best method, and the primary object of my paper was more than any other to answer the question how much to feed a baby. I do not believe that there is an American text-book that tells you how much to feed them; if there is I have never seen it. You will find tables with the age and the percentage, and such statements as "from one and one-half to three ounces ten times a day, or fifteen to thirty ounces," and it is reasonable to think that what will feed

one baby will not be enough for another, or too much for another. By the method of calorimetric feeding you feed the baby according to its weight; it is not a matter of hypothesis, but it is a matter to work out by absolute observation. You compare the gain of weight in the child from time to time. I think this is a good method. Holt has said that the majority of practitioners do not know how to use the different methods of percentage feeding. He has found the greatest discrepancy in the percentages. Some methods are based on the absolute indigestibility of the cow's casein. I have not seen better results anywhere than Holt gets in feeding, and this at the clinic incited me to attempt the method. I believe it is a good one, and I believe it is scientific.

L. P. Drayer: These papers are very interesting, and Dr. Jackson's presentation of a method of feeding babies according to their needs is timely, commending itself to us for the sake of further study. The method is not familiar to me, as it has not appeared in English except in a vague sort of way, and I am pleased to have had the opportunity to have heard the paper. Any method of feeding a baby artificially must be in itself simple to be of value. By way of criticism, to take top milk and add for dilution lime water and milk sugar and more water and diastase and numerous other things involves a mixed-up process which never will and never can succeed. The more you trifle with the milk the worse you make it for the baby. Simplicity is the keynote for successful modification. Prescribing top milk with dilution and adding this and that and the other thing for the sake of aiding digestion is nearly always wrong. The infant, almost from the first day, shows a diastastic power of digestion; this is demonstrable oftentimes from the first week of life. So that I say the method which feeds your baby just enough to keep it gaining in weight is exact, is scientific, is not a waste of raw material and is the ideal method. Now, then, I think that each practioner should adopt for himself a certain method of infant feeding, be that what it may; but let him understand one method perfectly and then follow out that line in his practice and have for his keynote in his whole procedure—simplicity.

THE CATARACT OPERATION.

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The operation for extraction of senile cataract is performed in so many different ways, at least in some of its details, that a brief consideration of the subject should not prove uninteresting or unprofitable. This paper is based on the writer's experience of seventeen years in eye surgery, personal observation of the work of many operators in this country and abroad, and careful study of numerous text-books.

First in order as well as in importance, is preparation. It will be assumed that the cataract is ripe, or practically so, although, exceptionally, operation on unripe catracts is perfectly justifiable. The patient's condition should be rendered as good as possible by careful attention to the control or removal of unfavorable symptoms, like cough and incontinence of urine, and the building up of the general health. The bowels should be emptied thoroughly the day before the operation, the body bathed and perfectly clean clothes given for the person as well as for his bed. Lachrymal disease or conjunctivitis must be cured or eradicated. Just before commencing the operation, the lids and face should be washed with green soap and warm water, attention being given to the lashes. Some operators also advocate washing these parts with a strong bichloride solution. In Berlin University Hospital the eyelashes are cut off. In one case in which the writer did this he experienced some difficulty in trying to lift the lid out and down over the wound, which could have been done easily had the lashes been left alone.

It is impossible to render the conjunctival cul-de-sac sterile. To use the strong solutions and vigorous scrubbing employed in preparation for operations on other parts of the body would, by the irritation and congestion produced, increase rather than decrease the liability to infection. It is well, however, to irrigate the eye with normal salt, boric acid or weak bichloride solution, the latter not exceeding in strength 1 to 6,000. Some of my

patients have used a very weak bichloride or argyrol solution a few days before the operation. Covering the face and forehead with gauze is a common procedure, a hole being made over the eye large enough to admit of free manipulation.

It goes without saying that the surgeon's hands should be thoroughly sterilized, notwithstanding the fact that they do not come in contact with the wound. He should wear a sterile gown and cap. Mellor, of Vienna, and others also wear a gauze mask over the mouth to ward off the danger of infection from the surgeon's breath.

All dressings should be sterile, and instruments likewise. Every instrument used in the operating-room at Moorfields is boiled, but many surgeons, fearing the effect of this upon the edge of knives and scissors, simply immerse them in alcohol. Others rely on carbolic, soda or other antiseptic solutions. The writer's preference is to boil everything but the cataract knife, the blade of which is held in boiling hot water for one minute.

Very nervous patients and those hard to control should be put under a general anesthetic, but in most cases it is preferable to employ local anesthesia. While 1 per cent. holocaine and other similar solutions are occasionally used, most ophthalmic surgeons prefer cocaine, from 2 to 10 per cent. The weaker solution is hardly sure of properly anesthetizing the cornea; the stronger is much the more likely to prove satisfactory, in many cases even rendering the iridectomy painless. Three or four instillations at intervals of three or four minutes usually suffice.

The necessary instruments for a cataract operation are lid-speculum, fixation forceps, Graefe cataract knife, iris forceps, iris scissors, capsulotome or capsule forceps, lens spoon, wire loop and spatula. A lid retractor may prove of service also, and a pair of scissors for enlarging the corneal incision, if found to be too small. Landolt has called special attention to the kinds of instruments well adapted, as well as those ill adapted, to the purpose intended in this operation. While Critchett raises the upper lid with one finger of the hand holding the fixation forceps, and some others have their assistants separate the lids with fingers or retractors, most operators use a speculum. The best of these are the wire stop-speculum after the von Graefe or Noyes model, or the solid plate of Lang. The latter has the advantage of keeping

the lashes away more perfectly and also obviates the possibility of getting caught in the wound, which might happen with the wire if the patient violently contracts his lids when the surgeon is removing the speculum. One worked with a screw is under better control than one with a ratchet. It is important, also, that it be curved sufficiently to be as much as possible out of the way of the operator.

The fixation forceps should be provided with a catch easily worked. The writer for years used one without a catch and found it quite satisfactory. The advantage of the catch is that the hold is more secure, but if the catch is not easily worked it may cause considerable embarrassment.

The cataract knife should be narrow, very sharp and have a perfect point. A dull knife, or one that does not penetrate readily, may be the cause of failure. Many operators use a new knife or one that has just been sharpened for every operation. Landolt points out the objection to metal handles—the unnatural feeling. Ivory and bone are better. He also says the handle should not be of a shape that turns too easily in the fingers, but it should have flat surfaces that admit of a firm and steady grasp.

Iris forceps may be straight or curved. They should not be too long, but should be so constructed that the iris may be securely held. The ordinary curved iris scissors may be employed or the special scissors of DeWecker.

The capsulotome or capsulotomy knife is really a small sharp hook which cuts the capsule readily. Collins and some others prefer a special forceps by which a portion of the capsule is removed. While this, if successful, makes a secondary or capsular cataract less likely to occur, this method involves so much danger of dislocating the lens and losing it in the vitreous that it has not been very generally adopted. The uses of these and the other instruments mentioned will be made more clear in describing the steps of the operation.

The question of assistance is very important. Some men succeed well by themselves, preferring no assistants at all to those who are untrained or unknown to them. Haab says one assistant is indispensable, two are better, and in some cases he uses three—one to hand him the instruments, another to hold the patient's head, and a third to keep the speculum from pressing on the eye-

ball and to steady the ball or clip off the iris in making the iridectomy. In my judgment this is important, for where the eyeball is not kept still by fixation forceps a violent movement when the iris is seized by the forceps might tear that membrane and cause much hemorrhage and traumatism.

Having carefully adjusted the speculum in a way not to press on the eyeball or cause much tension on the lids, the operator should tell the patient to look up, down, right and left a few times to see that he has good control of the movements of the eye and will not be likely to fail to look in the desired direction when asked at a critical moment in the operation. The conjunctiva and subjunctival tissue are then seized with the fixation forceps in the left hand just below the cornea, nearly in the middle line (the surgeon, if right-handed, standing behind the patient's head when operating on the right eye, and in front to the left side in operating on the left eye; if ambidextrous, either behind or in front for both eyes), the cataract knife held in the right hand with the cutting edge upwards is entered at the corneo-scleral junction, outer side, about the width of the blade above the equator, is pushed across the anterior chamber and made to emerge at a corresponding point on the other side, cutting upwards with point and heel as the knife is pushed forwards and slowly pulled backwards, the last part of the incision being made by a series of short sawing motions until the flap is completed, always keeping as closely as possible to the sclero-corneal junction. The objection to doing this too rapidly is that very sudden emptying of the anterior chamber might cause dislocation of the lens, loss of vitreous, detachment of the retina, or intraocular hemorrhage. On the other hand, making the incision too slowly allows all the aqueous to escape by the time the cut is finished. A medium course avoids the dangers of the first method and the embarrassment of the second. Some operators place the incision considerably within the corneal edge. This is less favorable to healing and more liable to infection. Others make the incision in the sclera, which increases the danger of prolapse of the iris, loss of vitreous and severe iridocyclitis. Some American operators make a small conjunctival flap, while many Europeans make a large one. One serious objection to this is the hemorrhage produced. It also renders the iridectomy and other

steps of the operation more difficult. The argument in its favor is that healing takes place more readily and infection is less likely. In four recent corneal sections for iridectomies, the writer did two with and two without conjunctival flaps. Those with the flaps did heal a little more quickly than those without, but with no better final results, and it seems doubtful whether the gain offsets the disadvantages above mentioned. One caution is necessary about the size of the corneal incision. While a very large flap would seem objectionable from greater apparent danger of collapse of eyeball, loss of vitreous or infection, as a matter of fact there is much more danger in making too small a flap —a serious blunder of inexperienced operators—whereby the lens can not be delivered and the continued pressure forces it down into the vitreous. The incision should comprise two-fifths of the corneal circumference. This, at least, is a good average rule or standard.

The next step is the iridectomy. Some operators omit this on the ground that it is better to preserve the round pupil. The writer followed this method in most of his early cases with pretty good results. But it is open to the objection that there is great danger of prolapse of the iris and its incarceration in the wound. A rigid pupil also may hinder the delivery of the lens, while the iridectomy makes this easier, requires less pressure upon the ball, a smaller corneal section, allows more freedom to the patient after the operation, and is less likely to be followed by glaucoma. In reply to those who favor one method for private patients and the other for clinical cases, Landolt rightly says: "I employ one method for all cases, with an iridectomy, the safer method; for all my patients are equally valuable." Visual results by the two methods are substantially equal in the successful cases.

There are different ways of doing an iridectomy. Fuchs has shown that a small one has all the advantages of the large one without the decided disadvantage of letting in too much light, so as to be dazzling and annoying to the eye. Some of the Boston oculists simply buttonhole the iris near the periphery. Most surgeons take out a piece from the upper pupillary margin, converting the round pupil into one shaped like an inverted keyhole. It is not necessary to seize the iris so near the pupil as some do, the objection to that being the excessive traction almost always

felt by the patient in spite of the anesthetic. The writer steadies the eyeball with fixation forceps in the left hand and withdraws the iris with straight iris forceps in the right hand, trusting the clipping off of the iris with the scissors to the assistant. Hemorrhage is usually slight.

The next step is the capsulotomy. For this purpose I like an instrument with a capsulotome at one end and a spoon at the other, held in the right hand, and the lens scoop in the left, the fixation forceps being removed. The patient is told to look down, the capsulotome is entered with point turned sideways until it reaches the middle of the capsule, when it is applied to the capsule and a crucial incision is made gently, avoiding pressure that might dislocate the lens. Some prefer T or V-shaped incision. Knapp makes the incision to one side, expecting to do a needling later. This hardly seems necessary, as so many cases give fine visual results without needling when the capsulotomy is made centrally. The catching of tags of capsule in the corneal wound is a danger to be avoided if possible. The capsulotomy made, firm but gentle pressure is applied with the spoon against the lower part of the cornea, directed centrally, by which the lens is usually caused to present at the wound and may be easily expelled. The wire loop may catch it, or in some cases may facilitate expulsion by exerting a little pressure on the posterior lip of the wound. Occasionally it has to be passed into the eye to lift out the cataract. If the lens fails to come forward, the capsule has probably not been divided and the capsulotome should be tried again. If the lens presents at the wound but fails to pass out easily, the corneal incision is probably too small and should be enlarged on each side, sometimes on one side only, by a probe-pointed knife or scissors. Too much pressure should be avoided. If the lens falls into the vitreous, it may sometimes be fished out successfully with the loop. A moderate loss of vitreous is not serious, although the danger of infection is somewhat greater whenever there has been an opening into the vitreous chamber. Injection of normal salt solution has saved some collapsed eyeballs.

While the ideal operation is where the whole lens comes out promptly and cleanly, in many cases there is more or less soft cortical lens matter left that needs to be teased out. Often this

can be done by gently stroking the cornea from below upwards with the spoon, or with the lower lid. At times the spoon is passed into the anterior chamber. Formerly much was said about avoiding the danger of traumatism or infection by introduction of instruments, and lens matter was left in to be absorbed. In many cases this answered well; absorption was complete—often slow. Sometimes the lens matter united with the capsule to form troublesome secondary cataract, requiring further operations, not always satisfactory. In reply to a question of the writer, Mr. Lawford, of Moorfields, said manipulation was less dangerous than to leave in the lens matter, which formed so favorable a culture-medium for germs. Lippincott and others make a routine practice of syringing out the anterior chamber. The objection to this in all cases is that it is usually unnecessary. Another objection is that it offers a new possibility for infection or traumatism, but it is doubtless useful in certain cases.

As a rule, I leave the lid speculum in place until the delivery of the lens, as it keeps the edge of the lid away from the wound. But it is often removed either just after making the corneal incision, or just before or just after the division of the capsule. Then the lens may be delivered by using the lids under the surgeon's fingers for pressure and counter-pressure. Williams, Kalt and others have introduced a fine corneal suture to prevent prolapse of iris, etc., but it is not generally used on account of the dangers of traumatism and infection, and because it is unnecessary, primary and speedy union of the wound being the rule without deformity.

The variety of opinions regarding the dressing of cataract cases simply shows that many of these cases would probably do well with any kind of dressing, or even without any at all. Some advocate the open method, but there is danger of the patient injuring or infecting the wound in sleep. On the other hand, covering and bandaging the eyes may be overdone; conjunctival secretion is thereby increased, and that in itself adds to the danger of infection. A little sterile gauze over each eye, held in place by a small piece of adhesive plaster, answers very well, together with a Ring's mask or some similar device for protection. After the third or fourth day the dressing may be left off the unoperated eye and a hole made in the mask at the proper point to give

the patient use of the eye, and two or three days later all dressings may be left off the other eye also by day, a pair of smoked glasses being given to protect from strong light. Wearing the mask at night for another week or so is advisable, if the eye remains tender. At Fuch's clinic, in Vienna, the unoperated eye is covered only one day and the other but three or four days, and the patient is allowed to walk from the operating-room to the ward. Schnabel has a sort of low car which carries the bed into the operating-room and back to the ward, while at Moorfields a stretcher is placed under the patient upon the table and he is transferred by this to the moving-car and thence again to the ward bed.

The use of eserine or atropine before operating seems unnecessary and inadvisable. The former is still used to some extent after the operation to prevent prolapse of iris, but not as much as formerly. To ward off iritis or modify its severity atropine is used by the majority of operators as a routine, some beginning the first day, others about the fourth or fifth. The latter seems to be the better plan, as by that time the wound has healed sufficiently to prevent prolapse of iris, and iritis does not usually begin before the fifth day. Mild iritis is very common after cataract operation. It is usually controlled well by atropine and hot applications. Under this treatment, if vigorously and faithfully carried out, many of the severe cases will result favorably, but in some cases of violent iritis involving the ciliary body, sight will be lost, and in extremely rare instances the other eye also will be endangered by sympathetic inflammation. Dionin gives relief where pain is severe.

Prolapse of iris may occur even when an iridectomy has been done, although less likely, of course, than after the simple operation. To prevent this the lips of the wound should be freed from tags or ends of iris (or capsule) by use of the spatula or forceps and scissors.

Among the earlier dangers following this operation are intraocular hemorrhage and suppuration. The former is very rare, and usually means loss of the eye, sometimes necessitating enucleation. Suppuration, never very common, is even less frequent than before the days of antisepsis and clean surgery. But it sometimes occurs in spite of all precautions, perhaps from something

undiscoverable about the patient, or where the vitality is so low that the wound heals very slowly. The writer has saved two cases of suppuration by frequent irrigations, cauterizing wound, and the use of iodoform, argyrol, atropine and hot applications. Indeed, he has lost but two cases from suppuration, one in a very feeble old man, and the other a very violent infection attended by such terrific swelling and pain that the eyeball had to be removed.

In some cases the capsule is thick or some unremoved lens matter has united with it to form secondary cataract, making vision poor. Early needling will often give excellent sight. The knife-needle should be sharp, and tough bands should be avoided, the cuts being made where the capsule is thinnest.

Cataract glasses are prescribed the sixth or eighth week, those for reading usually averaging about 4 D. stronger than those for distance. Results vary from 0 to 20-20 or normal acuity, anything above light perception being regarded as a success. In one neighborhood I had four eyes with 20-20 vision, but the next one tackled in that locality was the worst of all results, my only case of sympathetic ophthalmia.

As an illustration of the different ways even successful cases may act, I recall three brothers in Hamilton County, the first leaving for home the ninth day with never a twinge of pain and hardly a bit of redness (his glasses adjusted later giving 15-20 vision); the second, one of the cases of suppuration above referred to, the eye being saved after a hard fight with almost as good sight as his brother, while the third (who had been blind for ten years) had an over-ripe degenerated cataract, a sticky mass that could not be all expelled and looked unpromising, yet by means of gradual absorption gave very gratifying and useful vision. Victory was snatched from apparent defeat in one case where the lens was lost in the vitreous by vigorously fighting the reaction until nature came to the rescue and the lens became quiescent and fixed low down, as occasionally happens in the method of couching formerly practiced so extensively.

Leading operators report success, in uncomplicated cases varying from 90 to 98 per cent. Occasional operators and those who do not always operate under the most favorable circumstances may well be satisfied with 10 per cent. less than this. Of course,

one must have some adaptation to this kind of work. Great carefulness and keeping cool are as important as dexterity. One oculist whom the writer met in clinics had so many failures in the first half-dozen cases attempted that he gave up the work in disgust. I had nine successes in my first ten operations, and eight in the second ten. Records are not complete enough to give accurate or detailed statements of results, especially as clinic cases often pass out from under our observation before results are known, but I recall only two failures in the past four years. The few failures, however, seen in my own practice, as well as that of other men, have had their lessons, not less in value than the successes.

In the directions here laid down there is no desire to convey the impression that the method advocated is the only one of merit. There are often many good ways of doing a thing, and one who has been successful with one method should hesitate long before he changes for another, whoever recommends it, as in his hands at least the accustomed method may be better. Still, interchange of ideas and discussion on such a subject may suggest something of value, and increase our confidence or correct a fault, thus adding to our reputations as well as to our usefulness to humanity.

DISCUSSION.

Dr. Geo. F. Keiper: This is a very excellent paper and ought to have been heard by every member of the state society in attendance, because the operation is not only important in its ultimate results; it may mean a great deal to the patient, his friends and to a community. But it is also a formidable operation, not to be undertaken with the idea that it is easy to make. It is one of the most difficult operations and must be done in a limited space. A cut of a hundredth of an inch may spoil everything.

It is my advice not to operate in an operating room where other operations are done. In our own hospital we have a separate room for cataract and iridectomy operations where no other patients go. We operate in the morning. The patients are put in after having a thorough bath, with the eyebrows all cut off as well as the eye lashes cut short, and are put to bed between

sterile sheets, on pillows which are sterile, on high beds, and remain there for the operation and until they are safe to get ur. It saves trouble in lifting them. They sometimes try to help themselves, and strain the eye and lose the vitreous humor. We also follow the plan of the abdominal surgeons and tie a mask over the face of the operator. In the clinic in Zurich, Switzerland, they cover the face of the patient with a piece of sterile gauze, leaving an opening for the eye, which is also a good plan. Some operators, after the cataract has been extracted, paint the edges of the lids with ichthyol, with very good success, especially where there is danger of suppuration. Still we should not operate if there is danger of suppuration. If there is evidence of pus in the lachrymal sac it should be cleared upon and the patient subjected to no risk.

Through the aid of the instrument dealers, knives are made with metal handles, such as the general surgeon uses. I believe the consensus of opinion is that there is no better handle than the old ivory handle. They are not so slippery and we can hold them better, and we will go back to them again in operations for cataract.

I mentioned in the beginning that the operation might be of considerable importance to the patient, his friends and the community. I have operated where people were taken off of the county support, and one is now able to work on the streets, and so we become eyes for them. The subject is of importance, and the general practitioner ought to be able to recognize cataract, although he may not be able to use the ophthalmoscope.

EYE STRAIN.

BY WALTER J. LEACH, M. D., OF NEW ALBANY.

Eye strain is the resulting conditions of ocular overwork, and may contrast very greatly in proportion to its etiological factors. For instance, an eye with normal refraction may manifest great strain when doing no more work than an abnormally refracting eye is doing which might not manifest strain at all. A normal eye is known as an emmetropic eye, and will, when in a state of rest, or, in other words, when not using the accommodating focus parallel rays of light upon the retina which come from a distance of twenty feet or more. Any deviation from this rule is known as an error of refraction, and may be hyperopic, myopic or astigmatic, depending upon the point of focus or lack of point. Any or all of these errors are classed under one head, known as ametropia in contradistinction to the term emmetropia. Light rays coming from a distance less than twenty feet are focused upon the retina by the mechanism of accommodation, which consists in altering the shape of the chrystaline lens, making it more or less convexed as needs be, depending upon the distance. Contraction and relaxation of the ciliary muscle, which in turn loosens and tightens the suspensory ligament, is the force which governs the changes in shape of the lens which has for its object accurate focusing of the rays upon the retina. This is also accompanied by convergence and contraction of the pupils as the object viewed is brought nearer.

In a word, the emmetropic or normal eye does not call forth accommodative efforts except when viewing in the distance less than twenty feet, but when does the hyperopic or astigmatic eye rest? Never so long as it is open to the light. Why? Because of the involuntary effort to secure normal vision with an abnormal eye, which requires constant accommodative efforts for all distances to focus rays upon the retina, unless it be in cases of absolute presbyopia, which is of itself a failure of accommo-

dative power from senility, in which case good vision can not be secured without artificial help.

The foregoing facts should well explain why ametropia is an extremely important etiolological factor of eye strain which is particularly true of astigmatism. A common manifestation of eye strain is ciliary cramp or spasmodic accommodation, which consists of either a tonic or clonic cramp of the ciliary muscle. Clonic ciliary cramp is apt to be coincident with hard work and rest, but the tonic form is more persistent.

Ametropia is the most frequent cause of cramp, but we find it in emmetropic eyes and in eyes made emmetropic with glasses. Hyperillumination before the eyes instead of coming from the rear, as it should alwys come, is a cause of cramp. Systemic disease, hysteria, severe mental excitement, etc., manifested by severe ocular pains, headaches, which follow a visit to the theater or bargain counter, viewing moving pictures, train ride, hard week in school or striking a balance for the month, fine needle work, etc., these are all familiar symptoms to the oculist as a part of the history of an attack of migrain or other nervous explosions.

Cramped accommodation is the condition wherein a hyperope may simulate a myope, and can not accept other than a minus lens until a cycloplegic is used to relax the muscle, hence the frequent errors of the itinerant optician who refracts without the drops. His results remind us of the girl who jumped into the river to get out of the rain.

Another prominent factor is asthenopia. The term means weak sight, but is sometimes used synonymously with eye strain. I deplore this confusion because it is deceptive. For instance, a weak-sighted eye may be at absolute rest; therefore could not be strained. On the other hand, a strong eye may be much overworked, and therefore strained. This simile might apply to the horse, or the doctor himself for that matter. Any of the forms of asthenopia, such as muscular, retinal or accommodative, may be a cause. So may they be a result as well, but are not equivalent to or synonymous with eye strain.

Accommodative asthenopia frequently follows severe illness, such as typhoid fever or la grippe, and is a part of early presbyopia. Muscular asthenopia means asthenic extra ocular mus-

cles, most frequently the internal rectus, producing exophoria, and is a very painful and troublesome cause of eye strain. This is quite evident, because to maintain good binocular vision it is necessary to have proper convergence of the two eyes. It may also be the result of eye strain. Retinal asthenopia is a rare form, and may be the predisposing cause of strain, as this form of trouble precludes the possibility of doing much work, and if work is persisted in it will produce strain. Many eyes develop retinal asthenopia through overwork or fatigue.

A myope is usually asthenopic through ciliary impotence, and this reminds us that the myopic eye is very unstable, and frequently is a diseased eye whose pathology is characterized by denutrition or innutrition. Furthermore, this form of trouble becomes progressive, and if neglected may cause blindness; hence no myopic eye should be neglected, and especially of the progressive forms. The various forms of asthenopia are often combined in the same patient. In referring to ocular nutrition we are reminded that no patient who is convalescing from severe illness should use the eyes excessively until recovery is complete, for fear of ocular denutrition or ciliary cramp. In dealing with refractive errors as a cause of eye strain we find it is not the degree of refractive error that determines the amount of strain, but it is the susceptibility of the patient which determines the gravity of the symptoms, and this is proven by the occurrence of strain in emmetropic eyes. Nevertheless many oculists refuse to prescribe lenses for patients whose refractive errors are of low degree, although the patient is really strained and manifests typical symptoms. I believe with Dr. Geo. M. Gould that ever so slight an error should be corrected if the patient manifests strain, at the same time correcting the ocular hygiene as thoroughly as possible.

Muscular imbalance, which produces the various phorias, is a frequent cause of eye strain. This is explainable by the fact that in order to give perfect binocular vision the extra ocular muscles must be co-ordinated perfectly in order to focus the two eyes on the object by accurate convergence; then we readily see how muscular imbalance may also be the result of overwork or strain. The various toxaemias may produce asthenic condition of the eye, and thereby predispose to eye strain. Then we have full com-

prehension of what eye strain consists and of its etiologic factors, and are prepared to recognize its symptoms, manifestations and results, as well as the remedies indicated. The symptoms are many and variable. Some of the most important are eye pains, headache, blurred vision, though many cases of strain do not manifest it by blurred vision. Migrain is very significant and calls for examination of the refraction in every individual. Reddened and irritable conjunctiva, blepharitis, styes, profuse tearing, indigestion, nausea and vomiting, sleeplessness, twitching of the eyes, photophobia, hysterical and epileptoid attacks, irritable temper and general sourness, enuresis and insomnia, vertigo, melancholia and fear of impending danger are all indicative of strain. Lateral curvature of the spine is undoubtedly sometimes caused by strain, and therefore is a symptom of importance. Early presbyopia is also suggestive of strain. Each of this long list of symptoms is especially significant, and no physician can afford to overlook them. I do not say that eye strain is the only cause of each of these symptoms, nor do I say that each case manifests all of them; on the other hand, many patients will manifest only one or two of them, which is quite fortunate for the patient, and here I wish to reinject the thought that many individuals have one or more prominent causes of eye strain, and often these causes are inactive or do not assert themselves, or are compensated for in some manner, and the patient may be perfectly comfortable and unaware of their presence.

Hypertrophy of the ciliary muscle compensates for and secludes many errors of refraction by the physical phenomena of accommodation, which is the logical basis of all strain. I would not concede strain in a patient who for any reason had lost the inherent faculty of accommodation. In removing the lens from the eye accommodation is destroyed. The eye from which the lens has been removed may show signs, such as photophobia or excessive lacrymation; but that is not strain, it is trauma through an inability with the manifest efforts to shut out the excessive light. Then it is necessary to distinguish trauma from strain. The most of the cases of ordinary strain are gradually relieved of their painful symptoms by the time they are quite presbyopic; for instance, at the age of sixty-five or seventy years, though they may suffer much permanent damage to the eye and much

lowered vision, and the low degree ametrope is apt to manifest a great struggle at about the age of thirty-five to forty-five. In order to manifest the accustomed acuteness of vision, because it is the time in life when presbyopia asserts itself, this accommodation crisis in the inception of presbyopia is analogous to the struggling decapitated fowl when life is ebbing away. Perhaps the physical or mental manifestations of eye strain are more difficult to explain than any other, but it is not more mysterious than an attack of fainting, syncope or nausea from the sight of blood or other ghastly or unsightly aspects. Unexplained psychophysical phenomena should not shake our faith in clinical observation and hypothetical deductions. Most reflex phenomena have for their purpose protection and preservation of the body from injury, and reflex headache may give warning to rest the eye, which, if not heeded, may extend this influence to their centers and make the alarm of greater force and finally secure recognition, and thereby protect the eye from physical injury. It seems a question as to what length and breadth the alarm wave will have to assume and how many reflex centers it will have to dash upon in order to get recognition and treatment.

A sudden and unexpected burn upon the hand may convert one into an involuntary contortionist, especially if he is unable to remove the hand from the fire. If it is removable it will be removed involuntarily and without mental influence or command. How and why? Because the reflex centers recognize the injury and attempt the rescue before the intellect has recognized the situation. If the injury is great, the efforts may be unco-ordinated and badly correlated, but the intellect by this time is aroused and will take charge without halting to doubt or argue the question. So should the intelligent physician not wait heedlessly and argue the question when his patient is through a reflex center holding up a bulletin before him, proclaiming that they have lost control of their ward, who is in imminent danger.

At this writing I now feel prepared and resigned to the fate of being branded a Gouldite, and while I am not a real Gouldite, I do not resent the branding with a great amount of indignation, for I confess that should I attempt to disprove or qualify any statements he has made my finish would be like the Christmas tree in a cyclone, for I do believe that Dr. Gould has gone into a

more detailed and thorough investigation than any other living man, and, furthermore, has been more misquoted and worse misrepresented than any one of whom I know, which doubtless often stirred him to undue antagonism and caustic sarcasm; yet I have great sympathy and respect for an honest, fearless and aggressive reformer. True, he has been precise in his deductions, but accuracy is more important in opthalmology than any other branch of medicine. The proper shape of the eyeball and the proper consistence of the refractive media is absolutely essential to a good visual organ, for upon this depends the ability to focus the rays of light on the retina, which is necessary for good vision. The arm or leg may vary in size or shape and not lessen its utility, but merely make it unsightly, but not so with the eye. Its normal product is vision, and is only produced by refracting rays of light in the most accurate manner known to physical laws. The ultimatum is the most valuable and enjoyable special sense which endows animal life. Then is Dr. Gould not justified in his critical consideration of this matter? Accurate refraction necessitates a great deal of patience and careful work, hence the many failures and disappointments.

DIAGNOSIS AND TREATMENT.

Remember that not every case of poor vision is a cause of eye strain; for instance, impotence combined with indolence of effort does not entail strain under any circumstances, and sometimes in the case of vision the effort is not put forth unless there is strenuous need of accurate vision. Such is apt to be the case with the advance presbyope and also in young patients who are untrained and unaccustomed to good vision and have been from their birth. In a word, it is the excessive effort, put forth either voluntarily or involuntarily, which overcomes the visual apparatus and which precipitates fatigue, with its numerous symptoms, whether they be simple or complex. This is true whether the eye be physically normal or abnormal. Then we must locate the cause in each individual case before we can display any intelligence in treatment or brilliancy in results. The oculist can often gain a stanch friend in an ametrope who has gone on in life with perhaps only 20-200 vision, not knowing what he has

missed in the way of visual utility and enjoyable scenery until by accurate refraction he has opened up to him a new world of pleasure and usefulness. He will not only praise the oculist, but condemn and condole his previous existence. This patient had not the reflexes crying out for help, or if so, was ignored by the doctor, else he would have sought aid long ago. That may have been a case of strain or a case of ocular indolence, possibly superinduced by failure of efforts through accommodation to secure acute vision in early life. The first point in diagnosis is to determine if the eye is really strained; if so, the cause. Various cases manifest various symptoms, and many of the symptoms may be combined in one case. Let us give Dr. Gould credit for saying that not every case of strain needs glasses, hence the frequent failure to relieve patients by glassing them. Let me beg of the general practitioner not to destroy his patient's patience and rob her of valuable time by trying every drug of the materia medica before giving up to refraction when she manifests symptoms of strain. Fortunately, many patients with astute minds who have strain will suspect the trouble, and may supersede the physician and have their opinions verified by being refracted and given relief from symptoms. This would be unfortunate for the doctor who failed to advise it, because his fame in the patient's mind is very much shaken. This thought verifies the fact that ocular examination should not be the last resort, but among the first with patients who give symptoms which are characteristic of strain, even though there are other probable reasons for the symptoms, because there are many patients who have strain with accompanying conditions, especially so in debilitated cases. It is hard to excuse yourself for treating a patient for weeks, months or perhaps years, without permanent relief, after she has found relief from glasses which you did not advise, and the patient never will forgive you. Only those who are wideawake can succeed in medicine today.

The treatment of eye strain consists simply in remedying the cause in each individual case, and would require too much time for detail; but find the cause, and the remedy suggests itself. The observance of hygienic laws is of the utmost importance, and is necessary for the doctor's success as well as the patient's recovery. The State of Indiana is derelict of duty in not providing

a law for the medical examination of school children, especially for the eye, ear and throat, which would lessen the prevalence of contagious diseases and give timely warning in cases of defective vision and hearing. This would be quite efficient as a prophylactic treatment for young patients. Refraction of ametropes under the age of forty years as a rule is not accurate either for diagnosis or correction unless a cycloplegic is used, as the latent error is sometimes the whole trouble, and it is a latent error which makes the cycloplegic necessary. In cases of ametropia requiring glasses I prefer to use the static method; in every case fit the glasses while the accommodation is still relaxed and make the patient accept as nearly all of the correction as possible, even though it be necessary to use the drops mildly for a while in order to prevent return of cramp. Cases of fatigue resulting from overwork alone are not numerous, and usually yield to the rest treatment alone. Cases resulting from accommodative asthenia may require a weak spheric lens for close work only. Fatigue from muscular asthenia alone is difficult to manage. Ocular gymnastics and systematic tonics, such as strychnine, give best results. We have but a few such cases. Cases resulting from muscular imbalance are usually also cases of ametropia, and require careful correction statically, and we are in a limited number of cases forced to use prisms, but if possible I prefer not to do so but use ocular gymnastic exercises. Prisms encourage a weakness which they are intended to correct. Occasionally it is necessary to cut the short muscle or advance the long one. Those cases from strain resulting from diseases and abnormalities of the uveal tract must have rest with any other indicated treatment. In the statistical study of the connection of eye strain and headache Zimmerman found that the correction of optical error of 794 cases give the following results: Cured, 684 cases; improved, 90 cases; unimproved, only 20 cases. Zimmerman used a cycloplegic in more than 99 per cent. of the cases under forty years of age. These statistics are very significant and deserve our unbiased consideration. Refraction and glass fitting as a therapeutic measure may fail for various reasons, namely: First, all cases do not require refraction (for instance, emmetropes who have other causes than ametropia for strain); second, the patient's complaint may hinder the ultimate result; third, stopping

the cause of strain does not always stop the morbid effects, so look well to the diagnosis, etiology, treatment and management, and ultimate conclusions will be more satisfactory.

DISCUSSION.

Dr. D. W. Stevenson, of Richmond: This is a very good paper of the doctor's, and I am sorry that we haven't a larger attendance at this time when a paper so important is given.

In regard to the paper, I think the author takes it up very broadly; there are many views among the doctors in regard to the subject. I think that the general practitioner realizes the importance of refraction, and nowadays he sends them to the oculist long before he would in former days.

As the essayist said, in a number of cases you will see people who are forty or forty-five years of age and have never used glasses. And they are the very people suffering from strain, and I want to say right here that a great many of the troubles of life which we have between the ages of forty and forty-five, called the change of life in women and other things in men, are due to the fact that these people have not had glasses when they ought to have had, and the possibility is that they would not have had one-tenth of the trouble if they had had glasses earlier. When a man passes forty years of age and is not wearing glasses he ought to know first that he is either shortsighted or is an abnormal being, because when they get beyond that age they certainly need glasses in the great majority of cases, and when they get to forty-five it is absolutely certain that they need them. How does the general practitioner get along trying to treat these cases? You should watch the pupil of old people very carefully; see that it is not too small in size. The first glasses ought to be examined by or tested by the oculist.

In regard to Dr. Gould, I think he has brought a great deal of discredit to the profession, and I think in a great many cases the oculist should disown him, for he has overdone things and has written a number of books and has made claims for things which can not be sustained.

I thank the doctor very much for bringing this paper before us, and I think that most of the points given are well taken, and I

would be glad to hear from other members of the society for their opinion of it.

Dr. F. C. Heath: I find it necessary to come again to the aid of Dr. Gould. I agree with the statement in the paper that Dr. Gould in the main is right, but of course he is an extremist, and claims too much for eye strain. But he is a reformer, and every successful reformer is an extremist. Other people follow very far behind. I am glad that Dr. Gould is stirring up the profession in this important and, hitherto, much neglected field. This paper should have a wide circulation among the general practitioners to teach them the importance of eye strain.

Dr. Albert E. Bulson, Jr., Fort Wayne, Ind.: Dr. Gould has been severely criticised for his intemperate statements with reference to the effect of errors of refraction on the health, but the medical profession is beginning to recognize that there is truth in much of what he has said. Failure to secure results from the wearing of glasses when an error is known to exist may be due to faulty refraction work on the part of the one who examines the patient, as also to illy fitted frames. What we particularly need is more careful, painstaking and accurate refraction work. The physician who is fortunate in having a waiting room full of patients is not apt to properly and accurately determine complicated refractive errors unless he does his refraction work out of regular office hours. It takes repeated examinations, much time and no small amount of patience to solve some of the problems in refraction work, and it is the hasty, inaccurate and wholly unscientific work which gives Dr. Gould a basis for much of his caustic comment on glass fitting as ordinarily performed. The examination for glasses is a highly technical procedure if done properly, and it requires the aid of not only such instruments of precision as the ophthalmoscope, skiascope, ophthalmometer, phorometer and test types, and the use of a cycloplegic in all patients under forty and some over that age, but the sound judgment of a medical man having an intimate knowledge of the condition of the eye in health and disease. Glasses will not cure a bellyache nor remove ingrowing toe nails, but when properly adjusted for patients having errors of refraction, so frequently the immediate cause of inconvenience, discomfort and disease of

the eyes and disturbance of the nervous system, they have been known to produce almost miraculous results. I do not believe that true epilepsy can be cured by the adjustment of glasses, and judging from a recent conversation with Dr. Gould I do not believe he thinks so since his experience at the Craig colony. But I consider a very large per cent. of all headaches and many nervous manifestations due to eye strain, and relief is not secured until the eye strain has been overcome, and perhaps not then if there are other factors, such as faulty metabolism, unhygienic surroundings, bad light conditions, etc., which should also be corrected. There is a crying demand for more careful scientific refraction work, not for more spectacle adjusting, for we have enough of it with our itinerant opticians and ignorant spectacle vendors. The medical man should be the last to countenance anything but the most accurate scientific work.

Dr. Spohn: A very few of the cases of migraine are caused by eye strain. The first thing that seems to be done when the eye is found to be defective is to have it examined and fitted with glasses. Now this Dr. Thompson describes in his own case, and every case is just the same; in all of these cases of migraine they are not all due to eye strain, but a great many of them may be. And I believe, as has been said by the secretary here, that Dr. Gould, an oculist of Philadelphia, a long time practicing in Philadelphia, who has written a great deal on the eye and about eye strain has demonstrated by his way of looking at it that a great many diseases are caused by eye strain. For instance, he claims that many children in Philadelphia have curvature of the spine on account of eye strain. He says that the line of gravity is not where it should be, and they are out of balance, and this causes curvature of the spine.

I would like to refer to the cases which are often sent to the oculist, and they only get temporary relief, and then the patient goes back to the practitioner—the general practitioner—to say that he can not wear glasses. Now the oculist has done his part, but he should have sent him back to the general practitioner in the first place and have told him to watch the case, and then he might have been able to correct it.

Dr. A. E. Sterne, of Indianapolis: I am not an eye-strain

crank by any means; not at all. When you come to consider that out of twelve cranial nerves five go to the eye and four exclusively to the eye it is not difficult to measure the amount of irritation that could be given to the central nervous system through this source. I do not believe, however, in spite of what has been said here, that, as Dr. Gould says, 95 per cent. of the cases of epilepsy are due to eye strain. I believe that is incorrect and that it is a gross exaggeration. Now I have been in the practice for a great many years, and I have seen a great many cases of epilepsy—they have certainly reached into several hundred—and almost every case that has ever come under my observation I have had carefully tested by such men as Dr. Thompson, Dr. Morrison, Dr. Heath, Dr. Hood and other oculists of this city, and I have every confidence in the ability of these men to correct eye strain if such it was, and I have yet to see the first case which was cured from that; I have yet to see the first case out of several hundred. Now then, you will say, why do you continue such a course? Why have that examination at all, because it is of no benefit to you? Well, we know absolutely nothing of the true pathology of epilepsy; it is a closed book to us in spite of the work we are doing along this line. In spite of all this I continue to have the patient examined because, as I said before, I believe that the reflexes from the eye might be of considerable importance. There is no doubt in my mind that in this condition of epilepsy, as it has been brought into discussion, that we are dealing with facts, and probably there are as many variations as there are individuals, so the individual must be given individual routine treatment. Now I think the importance of eye strain is very great, but I also think it would be the greatest mistake in the world to consider epilepsy as being due to eye strain; it is only in those cases I believe where there is a manifest disability of the nervous system.

Dr. E. A. Willis, of Indianapolis: I was much interested in this paper read by Dr. Leach, which naturally perhaps is of particular interest to the ophthalmologists, but nevertheless might be of great practical value to the practitioner of general medicine. Relative to Dr. Gould and his methods in his practice, referred to by Dr. Stevenson in his pertinent discussion of Dr.

Leach's paper, I must say that, with many of his other friends, I feel that Dr. Gould has done and is doing things in his practice of ophthalmology that are of great importance to the medical profession in general, ophthalmologists in particular, and especially to the welfare of those patients that are fortunate enough to receive his attention.

Dr. Leach spoke of many important facts in regard to eye strain, and among the causes mentioned muscular conditions, referring to weakness and strength of the intrinsic ciliary muscle and the extrinsic recti and oblique muscles of the eyes.

With brevity I should like to say a few words regarding the extrinsic muscles of the eyes. I feel that too much stress can not be laid upon insufficiencies of the extrinsic muscles of the eyeballs as the cause of symptoms, simulating those of true eye strain in a large percentage of cases, that come complaining of such ordinary symptoms as have been set forth, when the eyes may be emmetropic or possibly ametropic to so slight a degree as not to be an adequate cause for the symptoms complained of. I am inclined to believe that nearly all ocular muscle insufficiencies are not primarily a weakness of the muscle itself, but are due to conditions that are present in some part of the nerve mechanism governing the muscle—in afferent reflex, efferent motor paths or cortical or nuclear center, indicated by lack of the normal desire for constant fusion and appreciation of the necessity and beauty of good perspective.

It is relatively an easy matter to strengthen the external and internal recti muscles to the power necessary to neutralize or overcome the action of their antagonists, and thus allow the eyes the ability, in so far as the strength of the muscles is concerned, to have the proper position for binocular vision. But the great difficulty lies in trying to educate the nervous centers or possibly open up new reflex paths or stimulate motor neurons, so that the person will, by the visual act in itself, then stimulate the nervous elements to renewed activity and the muscles to proper action, and thus tend by modified nervous action to stimulate muscles strengthened by exercise to increased activity in holding the eyes in the proper position for most satisfactory vision, with resulting revivifying in the nerve function, which will then tend still further to increase the desire for binocular vision and lessen

the tendency toward insufficiency of the muscles, with the final result that the muscles are able to do their required work, having the necessary nerve stimulus.

It is interesting then to consider here the advisability of cutting eye muscles when there exists a muscular insufficiency which is not due to condition of the relative strength of the muscles primarily, but to lack of innervation of the muscles to required action. In such cases we may feel sure, very sure, that surgical treatment, except as an aid in giving the eyes an opportunity to be more nearly in balance while such attention is given as is necessary to the cultivation of the either lost or unknown ability to fuse images and secure perspective, will be not only unnecessary, but may do much harm to the heterophoric, and may inhibit the chance of helping the sufferer by means that otherwise might result in his complete comfort.

Dr. J. L. Thompson, of Indianapolis: It is well known that a very large number of headaches are caused by anomalies of refraction, and that the proper adjustment of lenses will cure them. On the other hand, we meet with patients in whom we find hypermetropia or myopia, astigmatism, simple or compound, regular, irregular, or mixed. We examine the condition of the eye muscles, we prescribe the proper lenses, but we only partially relieve them, as there are other factors in the cure which cannot be corrected with any treatment to the eye alone.

One often hears the remark that "Specialists are narrow, that they only see things through the eyes of their specialty." This only applies to those who have never properly studied or practiced general medicine, who by their exaggerated claims bring dishonor to our profession.

Permit me to read to you from the circular of one who claims to cure nearly every ailment by the use of glasses alone. "Glasses," he says, "not medicine, will cure the following diseases." (I will only mention a few of them.) "Staring, jerking, blinking, catarrh, failing memory, epilepsy, sleeplessness, sour stomach, fetid breath, heart and lung trouble, indigestion, constipation, piles, female disorders, sallow complexion, ill temper, suicidal tendencies, pterygium."

Let us now turn to the etiology and treatment of migraine. Several highly educated members of our profession have contended

that migraine is caused by error of refraction or muscur imbalance, and that it can be cured by correction of the same. An experience of thirty-six years of continuous eye practice, during which time I have examined many hundreds of these sufferers, and having been troubled with it myself for over forty years, in every conceivable form, I certainly know something about its etiology. It seems to be one of the neuroses which may be brought about in certain susceptible individuals by disturbances of the stomach or retina.

Many times have I suffered after taking a large glassful of iced beverage, or from smoking a poor cigar on an empty stomach, or eating heartily at a railroad restaurant and then gulping down a cupful of the terrible boiled coffee which is usually kept in these dangerous places.

As to impressions made upon the retina, I will give a few of my experiences, as follows: On many occasions while walking rapidly along a high paling fence through which the hot sun's rays poured, the annoying symptoms have come upon me in a few seconds. First, a bright streak of light, then zigzag, bright colored angles circled to the right, just like numerous redans or bastions of fortifications. Very soon the right half of all objects disappeared. Larger and larger spread the circle of brilliant lines; then, after twenty or thirty minutes I could see the whole of any objects before me; then, after the bright redans and bastions disappeared, the most distressing headache came on. No two attacks were exactly the same; some were much more intense than others.

I have had them so severe that I could not recall my own name nor those of my most intimate acquaintances. Sometimes a tingling and numbness would pass down my arms, which at first caused me to fear paralysis (but a few attacks soon dispelled my fears). Three times have I suffered an attack caused by the sun's reflection from the very white head dresses of the Sisters of Charity; once from the sun's rays reflected from new and bright striped matting on my office floor; but these attacks were generally brought on when my stomach was not in its best condition.

I have suffered day after day for five or six days in succession and often more than once a day. Again have had intervals of rest for months. As one advances in years the attacks come on less frequently.

I have examined the refraction of my eyes very often and thoroughly, as well as that of many others, also the eye muscle balance, and can say that in a majority of cases migraine cannot be cured by glasses alone. I always prescribe them when I find astigmatism, even in a low degree, but at the same time caution my patients concerning their diet and any irregularities which are found to exist. I urge them not to eat rapidly, not to enter upon study or hard labor immediately after eating a full meal; to avoid smoking on an empty stomach, to remember the dangers of the railroad eating house and to avoid constipation. Many young persons are cured if they follow this advice, but adults rarely. They are often benefited, but not permanently relieved.

Dr. Heath: I do not want to be misunderstood as defending Dr. Gould in everything he says. I admit that he is an extremist. I think on migraine and epilepsy he has gone to the greatest extreme. I agree with what Dr. Thompson has said on migraine. I do not believe myself that eye strain has very much to do with epilepsy, but I would like to correct what Dr. Sterne said, that this matter was exaggerated; there are a very few of the oculists who are claiming that eye strain is an important factor in epilepsy. The point I wish to emphasize is that a great majority of the general practitioners will not even admit that eye strain causes headache. That is the thing you want to remember; it does produce more headache than all other causes combined, according to my judgment.

Dr. Leach: I will say that if the symptoms point to eye strain you are certainly justified in using the cycloplegic, but of course you would have to be very careful. I think in all cases like this the patient should undergo a thorough examination.

I thank you very much for your generous discussion of my paper, gentlemen.

INFANTILE HYPERTROPHIC STENOSIS OF THE PYLORUS —WITH REPORT OF CASE.

BY O. N. TORIAN, M. D., OF INDIANAPOLIS.

Previous to 1888 there are only three reported cases accessible in the literature of this condition. The first is that of Beardsley in 1788 and for the next 100 years only two can be found in the annals of surgery. In 1888 Hirschsprung read his paper and reported his case. This opened the eyes of the profession to this disease, with the result that about 160 cases have been reported up to the present time. In an article by Scudder and Quinby in 1905, 155 cases are tabulated and the condition is thoroughly reviewed.

The autopsy reports and the findings on the operating table are very much the same in all cases. The pylorus is unusually long and thick; often there is a tumor the size of a walnut or smaller. The stenosis is usually not complete, but the mucous membrane is swollen and thrown into folds so that water can not be squeezed through, though the probe will pass. There are no signs of inflammation as a rule. The muscle of the stomach is also hypertrophied in the early stages, but later dilation takes place and hypertrophy disappears.

Under the microscope the tumor is found to be composed of muscle. The average pyloric wall in health at six months measures 2.5 m. m., while in cases of stenosis it ranges from 3½ to 5½ m. m. The average size of the pyloric opening from birth to twelve months is from 19 to 32 French. The stenosed pylorus is one-half to one-third this size. Post mortem shows undoubted stenosis in all cases which have come to autopsy with the typical symptoms. The intestines below the seat of constriction are found collapsed as would naturally be expected. To again enumerate the autopsy findings: tumor, hypertrophy of muscle, narrow lumen, hypertrophied or dilated stomach, collapsed bowel occur.

There are several theories advanced as the cause of hypertrophic stenosis:

1. Muscular hypertrophy due to a prolonged spasm of the pylorus and finally ending in permanent stenosis. This seems reasonable from the fact that the disease usually begins in the second or third week.

2. Congential malformation in which the muscle is enlarged and the pylorus partially stenosed from birth. In this case the complete stenosis could follow by swelling the mucosa.

3. Pyloro-spasm. That the muscle is put in spasm by the traumatism it receives. This would explain some of the cases which get well under medical treatment, but on the other hand it is claimed that no case ever comes to autopsy with characteristic symptoms which does not show characteristic lesions.

The first and most important symptom is vomiting. It is forceful, and occurs at first after each feeding, but as the food is lessened in amount it may occur only after every two or three feedings. This at once draws attention to the fact that it is due to the quantity of the food rather than the quality. Usually it occurs immediately after feeding or within the first half hour. With all this, there is not the usual diarrhoea and undigested stool of an infantile gastric disturbance. The temperature is normal, the tongue is clear and the breath is not foul. The infant is possibly on a good breast milk which should cause no such disturbance. These little things together draw one's attention to the fact that he is not dealing with an inflammatory process or an intoxication. The vomitus contains no bile if the stenosis is complete, the gastric contents being normal as a rule. In two cases reported operation was delayed because of bile in the vomitus and both died and partial stenosis was found at autopsy. (Sanders & Schwayzer.)

In the reports we were able to find only four cases in which blood was found in the vomitus. (Schmidt, Thompson, Ashby and Cantley.) The average age for the vomiting to begin in fifty-two cases was seventeen days.

After a feeding or caused by thumping the abdominal walls over the stomach, peristaltic waves may appear, passing slowly across the epigastrium to disappear at the pylorus. It is seen only in the course of the disease before the stomach becomes dilated and is an attempt to overcome the stenosis. In the 155 cases reported in 1905 it was mentioned as having been observed

in one-third of them but it probably was not looked for early enough in the other two-thirds. In the recent reports it is present in nearly all. Tompson (Surg. Gyn. & Obstet., 1906, Vol. 3, No. 4) reports a case in which peristalsis followed thumping of the stomach and then reverse peristalsis with vomiting.

In 12 per cent. of reported cases a tumor was discovered a little to the right and a little above the umbilicus. In greatly emaciated infants it may be seen. A large liver, a dilated stomach, the crying of the infant, or muscular abdominal walls may obscure it.

Later in the disease the hypertrophied stomach with its peristalsis is replaced by dilation and peristalsis is absent. It fills the epigastrium and may be seen below the umbilicus. It is in marked contrast to the lower abdomen, which is flat because of the collapsed intestines. The intestines contain no food to pass on and therefore the infant is constipated. The movements return to their condition at birth, consisting of meconium, as there is nothing in the intestines in complete stenosis except their own secretions and bile. Naturally this infant is much wasted, losing weight steadily.

The characteristic symptoms are vomiting immediately after meals, which is explosive in character, peristalsis of stomach followed by dilation, tumor, flat abdomen, constipation, persistent wasting, meconium-like stools, absent fever. A case showing these symptoms could be nothing else. No one sign is diagnostic, however, but it is the composite picture which is characteristic.

It is to be differentiated from cyclic vomiting, congenital atresia and infantile indigestion. In cyclic vomiting anything put into the stomach, if only a teaspoonful, will be vomited immediately. In congenital atresia there has never been anything to pass the stomach, so the stools are meconium from birth and they contain no milk curds, also, they are sterile. The symptoms appear immediately after birth and continue rapidly to an end.

Indigestion being very common, it is at once suspected of being the cause of the vomiting, but if vomiting persists after carefully experimenting with food as to quantity, quality and time of feeding we may suspect stenosis. Stenosis no doubt exists oftener than it is found, and if it is carefully looked for in these cases of indigestion it will be discovered quite frequently. The fact

that a baby at the breast persists in vomiting a large quantity is a very suspicious sign.

There are several cases reported which show that stenosis may exist throughout childhood, in which the condition is only partial. Beardsley's case, unearthed from the old records by Osler, is famous, for the child lived to the age of five years with chronic stomach trouble and occasional vomiting. and the autopsy showed pyloric stenosis not due to inflammatory changes.

This depends very much upon the treatment. Some reported cases have been treated palliatively with success, but according to Scudder and Quinby, the diagnosis must have been wrong or else they were simple cases of pyloro-spasm. If the stenosis is complete it is unreasonable to think that anything but the knife could be of avail. On the other hand, if there is only partial stenosis palliative measures may relieve for the time, but there will be recurrences of vomiting and the child will be an invalid and probably die later as a result of complete stenosis.

If the condition is suspected early and the diagnosis clinched by watching for a reasonable length of time, the prognosis is fairly good with the proper procedure. But if the diagnosis is made late and the patient allowed to go too long, naturally there is not sufficient vitality left. According to Metzger, the average age at death is nine and one-half weeks. According to Shaw and Elting—of 104 cases diagnosed and treated without operation, 27 recovered, 77 died, and in 66 of these autopsy confirmed the diagnosis. This would make the mortality of unoperated cases 75 per cent. but this may be too low because of the possible errors of diagnosis in the 25 per cent. recovered. In several of the recovered cases the symptoms recurred and the operation was resorted to after all.

When it becomes apparent that nothing will pass the pylorus, the stomach having been washed, it is left entirely at rest and the necessary liquids supplied by giving normal saline per rectum, and care must be exercised in the amount given, for in our case the peritoneal vessels are overfilled and the peritoneal cavity contained an excess of fluid.

For an infant a few weeks old 5 to 8 oz. four times a day is sufficient, if retained. The quantity passed and the infant's weight from day to day are our guide to this. The stomach

should be washed once or twice daily in order to clear away the mucous and remove all irritating particles and give it a chance to functionate; later food or water is again cautiously tried in quantity smaller than that required to maintain nutrition to determine the state of the pylorus.

Holt speaks of rectal feeding as being of no use. We were able to give 4 oz. daily of predigested milk for about two weeks without the slightest disturbance. Of course, that was a very small amount to be of much benefit but these cases are delicate ones and the little things often make great differences. Cantley recommends the use of cocaine gr. 1-1000 or tr. opium 1-4 every hr. to relieve the irritability of the stomach and the pylorus.

Some writers advocate operation as soon as the diagnosis is made, but in view of the fact that there are cases reported which have recovered without, it seems to me the part of wisdom to wait four or five days to a week, depending upon the patient's condition, to test the palliative treatment and prove the diagnosis.

In the records to date there are about ninety operated cases reported, with the following results:

	Cases.	Mortality.
Gastro-enterostomy	59	51 per cent.
Divulsion	17	53 per cent.
Pyloroplasty	13	46 per cent.
Pylorectomy	1	100 per cent.

The total mortality for the entire ninety cases is 51 per cent.

Divulsion is uncertain in its results, several cases requiring a secondary operation; also the trauma produced by the instrument may lead to gangrene or perforation. Gastro-enterostomy and pyloroplasty seem to be the only justifiable procedures, and the choice depends upon the surgeon and the conditions existing.

REPORT OF CASE IN THE WRITER'S PRACTICE.

Infant two weeks of age August 3, 1906. Weight at birth 8 pounds, and perfectly normal up to age of two weeks. Nursing at breast when trouble began with vomiting, at first occasionally and later after each feeding.

Aug. 3d.—Vomited a brownish fluid which was altered blood. Temp. subnormal, stools normal, child quiet most of the time. Was put on feeding of albumin water 2 oz.

Aug. 4th.—Vomitus projectile after each feeding of alb. water.

Stools resemble meconium. Temp. 99—pulse 128. Stomach plainly seen distended with gas which rushes out with a gurgle, and accompanied by blood when stomach tube is introduced. Abd. flat above as well as below when stomach is empty. Gastric peristalsis plainly seen on irritation. Liver palpable one inch below ribs. No tumor. Colon irrigations with normal saline are used t. i. d. and infant passes urine freely.

Aug. 6th.—Water reduced to two drams every two hours by mouth and is vomiting only after several hours. Weight 7 pounds 3 ounces.

Aug. 8th.—Gastric peristalsis less marked. Child is strong and evidently in good condition. Operation was decided on and was performed by Dr. Jewett V. Reed, who saw the case with me on the 6th, and agreed with the diagnosis.

The stomach was washed and chloroform administered. On opening the abdomen the pylorus was plainly seen about three-quarters of an inch in diameter and very hard. The only evidence of inflammation about the pylorus was the adhesion of a small tag of omentum.

Dr. Reed performed a Heinecke-Mikulicz pyloroplasty and on exploring the stenosis was unable to introduce a No. 8 Am. sound. On the sixth day after the operation the baby weighed six pounds, and feeding was begun by the mouth. From this time on it gained steadily and has had normal bowel movements, but for several weeks after it vomited once or twice each day without apparent cause, but probably because of a partial stenosis remaining, which was gradually overcome and has caused no more trouble since.

In spite of having pneumonia and an abscess of the neck, the infant, at the age of ten months, is fat and healthy, weighing 18 pounds.

A YEAR'S CLINICAL EXPERIENCE AT FRENCH LICK SPRINGS.

BY GEORGE D. KAHLO, M. D., OF FRENCH LICK SPRINGS.

My purpose in selecting this subject is not to report in detail the clinical histories and results of particular cases but to indicate the different types of diseases which are referred to French Lick Springs, to give a general outline of the management of same and to point out those conditions which as a result of this experience seem most likely to be benefited by such treatment.

Notwithstanding the fact that balneologic practice is one of the most ancient of our medical art and, in Europe, is today recognized as among our most valuable therapeutic resources, it is, in the minds of many, still enshrined in much of its old time empiricism and tradition. Many causes have contributed to the skepticism which exists, foremost among which is perhaps the difficulty of forming a true conception of the processes taking place in the absorption and utilization of such complex solutions as mineral waters present and, as a consequence, the discordant opinions which have been expressed regarding their therapeutic indications; as also, the varying and sometimes unsatisfactory results that have arisen from their indiscriminate use.

We have in the French Lick waters very valuable therapeutic agents for the treatment of a large variety of diseases, the potency of which I unqualifiedly assert is not exceeded by any mineral water of their class. This opinion is based not only upon my experience at this particular resort but upon a knowledge gained by personal observation of conditions in other places of a similar character.

The reason that certain European spas have enjoyed such a favorable reputation is not that the waters themselves contain any virtues not possessed by waters of the same class to be found in this country but because the effects of such water have been better understood and they have been used with greater discrimination. It is only within comparatively recent years that an at-

tempt has been made to employ our own waters with the same scientific precision, and wherever this has been done physicians as well as visitors to such resorts have recognized that there is something more in mineral water treatment than a mere routine prescribing of the water.

Other factors such as diet, rest, exercise, change of scene, freedom from care, hydrotherapy, electricity, massage and good nursing are in many cases of almost equal importance and should be availed of to meet individual indications. Together they will give results which I have never seen equaled by the usual methods of practice at home.

The French Lick waters are derived from three different springs known respectively as Pluto, Proserpine and Bowles, all possessing the same general formula but differing considerably in the proportioning of their various salts, and hence in physiological action. They have as their chief therapeutic constituents the sulphates of soda, magnesia and lime, the chloride of soda, carbonate of magnesia and iron, as also carbonic acid and sulphretted hydrogen gas, all of which exist in sufficient quantities to produce their characteristic physiological effect.

Pluto water, the strongest of the three, is chemically almost identical with the waters of Carlsbad in Austria, differing only in temperature and in the presence of sulphuretted hydrogen. Proserpine water is of much the same character but is milder and hence a little less certain in its action. Bowles water contains a relatively small amount of sulphates, more chlorides, carbonates and iron. It is of much the same character as the waters of Homburg and Baden Baden.

The action upon the physical economy of the various salts contained in these waters when taken separately is well understood and needs no particular comment, but their effect when considered collectively and existing as nature has combined them is altogether different and can not be explained by their chemical analysis alone. Yeo in his work on the "Therapeutics of Mineral Waters" points out with truth that "the effects of salts in natural mineral waters are such as can not be obtained by any artificial imitation of them," and suggests that this difference may be accounted for by "the newly-discovered property of radio activity, by their greater solubility or by differences in electrical conductibility."

Whatever may be the cause, there can be but little doubt that even minimum quantities of substances in mineral waters may produce effects for which no analogy can be found in similar synthetic products, and there is a manifest tendency in the present day to look upon this subject from a much wider point of view than has hitherto been done.

Considering these waters, therefore, as a compound drug and not as separate agents, some of which perhaps act in conjunction and others in opposition, their effects may be briefly stated as follows: In large doses they are hydrogogue and chologogue cathartics, increasing secretion and peristalsis, as also the amount of fluidity of bile; upon the gastric mucosa they act to dissolve out mucous, and when the secretion of hydrochloric acid is deficient, to promote the function of the border cells. In hyperchlorhydria they neutralize the excess of acid and by their absorption increase the alkalinity of the blood: diminish the activity of the urine and stimulate the renal excretion.

The sum total of these processes is a markedly increased metabolism in the tissues with a corresponding increase in the elimination of effete products. In other words, they stimulate appetite, promote digestion and absorption and increase excretion, the result being a better nutrition.

Does this suggest to your minds many conditions in which these waters might be appropriately used? I can not indicate in any better way the nature of these processes than by submitting a brief classification of 1,864 consecutive cases which I have had under my care during the twelve months ending April first:

Diseases of the Stomach:	
Gastritis	114
Gastrectasia and Gastroptosis	33
Gastric Neuroses	62
Hyperchlorhydria	89
Gastric Ulcer	5
Gastric Carcinoma	2
	205
Constitutional Diseases:	
Diabetes	64
Obesity	70
Gout	59
Rheumatism	50
Anaemia	8
	243

Diseases of the Intestines:	
Constipation	112
Colitis	94
Enteritis	81
Proctitis	7
Enteroptosis	33
Intestinal Neuroses	69
Appendicitis	14
	410
Diseases of the Heart and Blood Vessels:	
Valvular and other diseases of the heart	36
Artered-schlerosis	18
	55
Diseases of Liver and Biliary Tract:	
Hepatic Congestion	36
Cirrhosis	17
Cholelithiasis	13
Cholecystitis	16
Cholangitis	45
Carcinoma	1
	128
Diseases of Genito-Urinary System:	
Parenchymatous Nephritis	16
Interstitial Nephritis	24
Pyelo Nephritis	5
Renal Calculi	8
Hydronephrosis	2
Floating Kidney	15
Cystitis	16
Prostatitis	10
Urethritis	17
	113
Diseases of the Nervous System:	
Neurasthenia	210
Neuritis	17
Neuralgia	32
Hemiplegia	5
Epilepsy	4
Tabes Dorsalis	4
Paralysis Agitans	1
Facial Paralysis	1
	274

Diseases of Respiratory Tract:	
Bronchitis	15
Hay Fever	18
Tonsilitis	3
Laryngitis	7
Asthma	9
	52
Infectious Diseases:	
Influenza	23
Malaria	23
Syphilis	8
Typhoid Fever	1
Pneumonia	1
	56
Intoxications:	
Alcohol	64
Drugs	14
Metallic Substances	6
	84
Diseases of the Skin:	
Eczema	36
Acne	32
Urticaria	16
Psoriasis	4
Ecthyma	1
Pruritis	3
Scabies	1
	93
Unclassified:	
Migraine	8
Synovitis	1
Acute Mania	1
Dementia	1
Carcinoma Pancreas	1
Bubo	1
Diverticulum of the Oesophagus	1
All others	26
	40

The foregoing classification is not put forward as scientific but is purely clinical. In many cases, of course, more than one condition was present, and such have been classified according to what appeared to be their principal feature. Others have arisen accidentally during the patient's visit or have been cases in

which treatment has been sought for diseases in which the waters have afforded no special indication. In still other cases no pathological condition was present. About one-half of the cases designated as neurasthenia presented well-marked symptoms of this disease, not a few of which were of a severe type requiring complete rest. The remainder merely manifested neurotic symptoms of a mild character for which no better designation could be given. Of the results obtained, taking them in the order here given, which corresponds to some extent also with the relative frequency to these conditions, we may first speak of diseases of the stomach.

Cases of gastritis, especially such as were accompanied by subacidity and an excess of mucus, were almost without exception greatly benefited, and many which were of long standing were apparently cured. The results in hyperchlorhydria were equally good, although perhaps a little less constant. It may perhaps be wondered how it is that conditions of such an apparently opposite character should yield to the same treatment, and I take the opportunity of saying that this opinion is based not on subjective symptoms alone but that such evidences of improvement have been repeatedly corroborated by chemical analyses. The treatment, however, both as regards the manner of administration of the waters and the diet, has been in many respects essentially different in the two cases, otherwise I do not believe such results could have been obtained--in fact, we have frequently observed the contrary where the waters had been used improperly. Good results were obtained in gastrectasia and gastroptosis except in such cases as were dependent upon some organic obstruction. In these conditions our chief reliance has been upon the use of the waters by lavage, only small quantities of the waters being drunk. In the purely neurotic conditions of the stomach the results have been more or less variable; a large majority were improved, some were uninfluenced by the tratment and in a few cases the waters seemed to be contra-indicated and were discontinued.

Constipation dependent upon intestinal atony was one of the most frequent of intestinal conditions and was always relieved temporarily. In some cases this improvement was of a permanent character even when no other treatment was employed than

the drinking of the waters, but the best results were seen in those cases in which the waters was supplemented by other measures, as massage, exercise, etc. Intestinal catarrh, especially colitis, was also very common. In a majority of cases constipation was associated, although in quite a large number diarrhoea was present. In still others there was alternating constipation and diarrhoea. The general results were most excellent; in many instances positively brilliant. Here again we had recourse in the use of the waters by lavage as well as drinking, with due attention to the dietetic indications. Excellent results were also observed in catarrhal appendicitis, enteritis and proctitis.

Congestion of the liver, the result of luxurious habits of living and insufficient exercise, responded very promptly to the treatment, as did also cases of cholecystitis and cholangitis. The waters seemed to exercise a very favorable influence also in cholelithiasis. The earlier stages of hepatic cirrhosis, hypertrophic or atrophic, showed unmistakable evidence of improvement in a large majority of cases. This, however, was not the case in those of a more advanced type in which there was edema, this being a distinct contra-indication for the use of the waters.

Nowhere have we witnessed better results than in the constitutional disorders, diabetes, gout and obesity in particular. Advanced cases of diabetes were not benefited as a rule, but we have time and again witnessed the complete disappearance of sugar after a few days treatment when it was present in large quantities and when the patient had already been following a suitable diet. Cases of chronic gout were, I think, without exception more or less benefited. In some cases the results were most excellent. The same may be said of obesity, subacute and chronic rheumatism. There were few cases of acute articular rheumatism, but these showed favorable progress.

Inflammatory conditions of the genito-urinary tract afford other indications of the use of these waters. I do not refer to cases of advanced nephritis but to the more incipient forms of this disease, as also to inflammations of the bladder and urethra. The cases of renal calculi all did well.

We did not expect, of course, any special influence from waters used internally in diseases of the heart, and where there is a failure of compensation they should be used with great care, but ex-

ternally in the form of baths they exercise a very beneficial influence. Very satisfactory results were observed in the treatment of anaemia, particularly those cases as had apparently arisen from the infections and chronic intoxications.

Nothing can be expected from this treatment in organic nervous diseases, but the environment at French Lick is quite favorable for neurasthenia and the results in these cases were generally very good, particularly those that showed evidences of digestive and nutritional disturbances.

Eczema, urticaria, acne and psoriasis are all conditions in which good results have been observed by the use of these waters both taken internally and used in the form of baths. We have seen many severe forms of these diseases respond very promptly to the treatment, and in not a few cases a cure was affected when the outlook seemed most unpromising.

Chronic intoxication of all kinds, alcohol, drugs and metallic poisoning yield excellent results, and convalescence from infectious diseases has been greatly facilitated by the treatment.

Necessarily it was impossible to follow the clinical histories of a majority of the cases treated beyond their stay at the springs, and the results referred to apply particularly to observations made during and at the conclusion of the treatment. Then in a considerable number of these cases we have kept informed as to their subsequent history by correspondence or have had opportunity for observing their progress during two or three successive visits. Examples of every condition mentioned as being benefited are I think included among these.

As has already been suggested, the treatment has included many accessory measures besides waters. One of the most important of these has been the baths. The bath establishment is equipped for the administration of all the usual forms of hydrotherapy, including sulphur, electric light, Russian and Turkish baths, the various forms of douches, showers and sprays, wet and dry packs, etc., but the sulphur is, so to speak, the staple bath of French Lick, as it is these baths, together with the waters, which have formed the basis upon which the reputation of this resort has been built. There are few conditions which afford indications for the waters at all in which some form of bath may not be employed with distinct advantage. The effects of such

procedures vary of course with the manner of their employment, and must be viewed from two different aspects. The first of them is the effect on the circulation, and through it upon the general bodily functions, especially such as are connected with the processes of digestion and nutrition; the second is the local effect, which is best observed in skin diseases and catarrhal conditions of the mucous membranes, although here we must not overlook the more widely reaching influences which act to correct the underlying causes of such affections. Unquestionably much of the good effect is due to the temperature at which the baths are given and to the various other devices employed in their administration; yet that sulphur water baths exert a particular influence which is distinctly different from baths taken under like conditions in ordinary water is easily demonstrable.

The French Lick waters contain a total of 247 grains of solids to the gallon, and in addition to this considerable quantities of carbonic and sulphuretted hydrogen gas. These substances exert a marked influence upon terminal nerve filaments in the skin by the stimulation of which reflex actions are produced which modify cutaneous circulation, relieve internal conjection and promote the excretion of waste material. These effects are still further accentuated by the gases which enter the circulation both by the respiratory tract and by direct absorption. Details of bath administration, such as the temperature, duration, the promotion or otherwise of sweating, are matters of considerable importance and must be considered on rational lines, having in mind the individual requirements.

Much attention has been bestowed upon the subject of diet, and in many cases the good results here recorded, especially in digestive disorders, have, I believe, been attributable in a large measure to this fact. A large proportion of the ailments for which these waters are used have their origin in a faulty regimen, and the acquirements of a more wholesome and a rational dietetic habit and its maintenance afterwards are among the great advantages to be derived from this method of treatment. Many of the prohibitions which have been urged upon persons drinking these waters have, I believe, as their only basis the mysterious influences of superstition or suggestion, but they have served the purpose of making it easier to obtain the co-operation of patients

in an adherence to that which has been prescribed. Certain substances, e. g., alcohol and acids, are undoubtedly incompatible with these waters, and we have frequently observed attacks of acute indigestion which have been due to the eating of fresh fruits, salads, etc., but in these cases it is not so uuch an incompatibility of the water as a natural intolerance of the organs of digestion for foods of this character. In other words, it is the disease which is present and not the water which governs the selection of a proper diet, and what may be eaten with impunity in one case may in another defeat the very purpose for which the waters are being used.

The various applications of electrotherapy have been largely availed of in cases affording indications for their use. A proper adjustment of exercise and rest is a factor of considerable importance also.

The almost universal custom of combining some form of exercise with the drinking of mineral waters affords assurance of its advantages, but exercise is not a specific for any given disease, still less is it a necessary accompaniment of the drinking of the waters. There are not a few persons for whom a course of the French Lick waters could be properly prescribed who need complete rest, and in such an indiscretion in this regard may seriously compromise the success of the treatment. Wherever it can be safely indulged in it acts to increase the effect of the waters by stimulating the activity of the skin, liver, kidneys and intestinal canal, and serves still further to purify the blood of its accumulated effete products. Many forms of exercises have been available in the treatment, including golf, riding, walking, bowling and such exercises as are usually employed in gymnasiums, and there is now about to be installed a complete set of Zander apparatus.

As regards the manner of prescribing the French Lick waters very few details of general applicability can be given. Not only do the effects of the waters themselves differ, but they differ also according to the manner of their employment, and there are other factors, such as age, constitution, temperature and previous habit of the individual, which have almost as important a bearing upon this subject as does the nature of the malady itself. Mineral waters like those of French Lick Springs are, like medicines,

agents which are capable of good or evil according as they are used. The usual custom is to allow an interval of fifteen minutes between glasses, to wait half an hour after drinking the waters before eating, and not to resume them until two hours have elapsed after a meal, but these are not rules which may be accepted as authoritative for all persons nor for all conditions; especially is this the case in diseases of the stomach on account of variations of motility and in the tolerance for waters of different temperatures. Very large quantities of the waters such as were at one time used are, I believe, seldom needed and have been but rarely prescribed. From three to nine glasses per day, taken at two or three periods, is usually sufficient, and only in exceptional cases is a larger quantity advisable. It has been our practice to use the waters hot in a considerable proportion of the cases, especially in gastric hypersecretion and in catarrhal conditions of the gastro-intestinal and biliary tract. In hyperchlorhydria and in gastrectasia the best results have been observed where small quantities of the waters have been taken hot at intervals of half an hour during gastric activity.

There is a popular impression that the length of the treatment is ten days, and that a more prolonged use of the waters is undesirable and may even be injurious. This is tradition pure and simple, and can not be supported upon any rational ground either from practical experience or scientific reasoning. In diseases of a mild type or of short duration this is probably all that is necessary, but in those of a more severe or protracted nature better results will most certainly accrue from a longer treatment, say one of two or three weeks. In some cases it should be continued for from four to six weeks, and in exceptional cases even longer than this. It is no more reasonable to assume that the use of a mineral water should be discontinued after a fixed number of days, regardless of dosage or condition present, than a prescription for medicine should be subjected to the same restrictions.

In conclusion, gentlemen, I wish to say that it has not been without some hesitancy that I have ventured to speak with such apparent emphasis regarding the merits of French Lick waters; not that there is any lack of confidence on my part, but that the motive for such statements might be misunderstood. I do not come here as the representative of a corporation seeking to ex-

ploit its interests, but as a fellow practitioner endeavoring to convince you of the value of a therapeutic agent which is apparently more fully appreciated by physicians in other parts of the country than by the members of our own society. The opinions expressed are born of a true conviction, and will find corroboration in those who have had opportunity of judging of the results obtained. I do not maintain that the French Lick waters are a panacea by any means; they will not cure all diseases nor all cases of those conditions in which good results have been claimed, but in such as I have enumerated as affording special indications for their use the results have on the whole been most gratifying—a great deal better indeed than I have ever been able to obtain in similar conditions heretofore. However much we may argue that this difference is due to the increased quantities of the water consumed and not to its particular chemical characteristics or seek to find an explanation in improved environmental conditions, diet, etc., the fact remains that the results have been good not alone in a few cases but in many, a goodly proportion of which have failed to show improvement either as a result of medicinal measures which are generally regarded as useful or of change of scene, climate, diet or other influences which have previously been employed. We must, I think, concede that the credit should in some measure be accorded to the waters.

DISCUSSION.

Dr. F. J. Walter: Dr. Kahlo has asked me to open the discussion because of our allied experience, mine being at the Mudlavia mud baths and Dr. Kahlo's at French Lick. The most striking point in Dr. Kahlo's paper is the wonderful scope of the eliminative bath treatment, and after one has spent a short time at a resort of this kind we begin to wonder where the limit of it is. Yet there are certain conditions that such treatment is not indicated in. My experience at the mud baths has made me an autointoxication crank. I believe two-thirds of humanity is troubled with constipation and obstipation and intoxications, and that elimination from a course of treatment of ten days to three weeks is proved to be a wonderful intercurrent treatment in any disease. Any place where we need to give a cathartic shows a torpid condition of some of the internal organs, and anything that relieves

the bowels, the kidneys and the skin, which are often overlooked, is a wonderful means of overcoming disease.

Dr. Theo. Potter: It is not such a very strange thing after all that such a plan of treatment applied in a resort of this kind does cover such a wide field as the doctor said, when we remember just what the treatment consists in and what the patient gets. What does a man get at these springs? First he gets a change, and that is very important. In the second place he gets a rest, which is immensely valuable to a large number of people who live a high-tension life. Now with that as a start he also gets what is probably the chief element in the treatment—the application by the bath, and by drinking the water the elimination. He gets these things and the rest which so many need, and which means a nerve rest, a rest from the high-tension life which produces so much disorder. It is the old thing the ancient Romans found out when they got to the point where a good many people ate too much, as they do now, and lived sedentary lives and lives of high nervous tension. Therefore they find a departure from home to places where they get rest, change and eliminative treatment, intelligently applied, of great benefit.

REMOVAL OF NECROSED SHAFT OF TIBIA, FOLLOWING CHRONIC OSTEOMYELITIS, IN A BOY—RECONSTRUCTION OF TIBIA BY NATURE—ALLIED CASES.

BY GEO. E. FULTON, M. D., OF BLUFFTON, IND.

History of the case: I was called to treat the case of a boy five years old, and received the following statement from his parents, who lived in the rural section of the country. The boy had been suffering with a difficulty in his left leg below the knee for the past several months. He had been treated at various times for what was thought to be rheumatism or cellulitis. The boy, however, was steadily growing worse, as the case was one of those migratory ones that drifts from doctor to doctor, and as a result had been sadly neglected, as no physician had visited him for some little time prior to my first visit.

My examination disclosed the fact that the diseased limb was inflamed, oedematous and swollen to twice its natural size from the knee extending down to the ankle. To the touch it was sensitive and boggy, and a distinct wave of fluctuation discernible at all points of the limb, showing plainly that just beneath the superficial integuments there was a large quantity of pus or at least a fluid. In getting a history of the case I was able to draw out from the mother the fact that the child had fallen on the doorstep some three months previously, and prior to the date of any trouble, but had complained only slightly at the time, and it was soon forgotten, so that when the limb became swollen and painful some little time following the date of injury it was merely thought to be rheumatism, and later on cellulitis, and thus the case, much neglected, drifted on. When I first saw the limb it was enormously swollen and distended from the knee to the ankle with pus, as previously stated. I at once made a free incision at a dependent point near the ankle and drained away a large quantity of pus largely intermixed with oil globules and very fetid, which from all appearances had been pent up for some

considerable time. Owing to the more or less recumbent position of the child and the yielding and elastic tendency of the tissues, the large amount of pus formed, and without drainage, had burrowed through and through the cellular and even muscular structures of the whole limb from the knee to the ankle. After draining away the pus from the tissues I then probed the bone at different points and found that the periosteum of the anterior aspect of the shaft of the tibia was not only destroyed, but that the shaft of that bone was necrosed and detached from the epiphysis above and below, and simply lying loose and could be rolled about in the bed of pus in the tissues. It was evident that a surgical operation would be necessary to remove the necrosed bone, and as the little sufferer was much reduced in flesh and vitality from the protracted illness it was decided at this time to place him on a tonic course of treatment for a short period to fit him the better for such operation as might be indicated. When the lad was sufficiently strong for the operation he was put under an anaesthetic by my brother, Dr. J. C. Fulton, and with his assistance I then proceeded with the operation, making an incision over the anterior aspect of the tibia down to the bone along its entire length.

A careful probing and ocular examination confirmed the fact that a chronic osteomyelitis existed, and the tibia, denuded of the periosteal covering, was necrosed and separated from the epiphyses above and below. The structures of the knee and ankle joints were not involved, strange to say, in the inflammatory and destructive process which had been holding forth.

A very fortunate condition was the fact that a strip of healthy periosteum corresponding in breadth to that of the tibia extended on the posterior aspect of that bone from the epiphysis at the knee to that of the ankle, and along its entire course there had been an attempt on the part of nature to "make good" and repair the damages which had been done by throwing out osseous or bone material, and the new osseous formation was beginning to arch up around the sides of the tibia, and a sequestrum was being formed of that bone. As the operation proceeded the tibial bone was removed as a whole by simply lifting it out of its bed in the tissues, care being taken not to injure if possible the strip of periosteum and the osseous exudation or bony ridge along its posterior surface.

The tibia having been removed, the flabby, unhealthy granular tissue and ulcerating pus sinuses found leading to the deep structures of the limb were now scraped out and destroyed with the curette. The long cavity where the bone had rested was packed with iodoform gauze, closed up by sutures, and with proper drainage, the dressings to be changed as required, allowing it to fill in gradually with healthy granulations from the bottom.

The future prospect held out to the parents for a useful limb was decidedly negative. It was explained, however, that the fibula, although not involved, was but a very small bone and could not alone give the support to the limb necessary to afford good results, and that some time in the future an amputation could be made, if thought best, to get rid of a useless member, and that the same could be compensated for to some extent by an artificial limb. It was advised to keep the foot and limb straight and in line and supported laterally, and no weight or pressure allowed to be borne on it for some time lest it should bend the frail fibula and distort the limb.

The patient was visited at intervals and the surgical dressing changed as the conditions demanded. It was not long until the flabby condition of the muscles of the limb began to disappear, and instead take on a firm and natural quality, the walls of the cavity closing in rapidly with firm granulations, and on deep pressure could be felt the firm osseous or bony ridge which was steadily forming and unexpectedly taking the place of the tibia.

Several weeks elapsed before I saw the patient again, but I had been regularly informed as to the progress of the case, and that it had entirely filled in with granulations and healed over. When I did see the case again, however, I was very much surprised to find that the limb had not only filled out in size equal to the opposite one, but in grasping it firmly and making deep pressure I found that what had been the osseous ridge or deposit had now developed apparently into a new structure like the tibial bone, as large and firm and substantial as the one of the opposite limb, and firmly united to the epiphyses of the knee and ankle.

The little patient, who in the meantime had been around on crutches, was now allowed to bear an increasing amount of weight on the limb, which was supported by plaster cast dressing until quite firm and strong, when he was allowed to walk without

the aid of crutches, and at that time had a limb apparently almost as good and useful as before his troubles began. Evidence is not lacking to show that various bones have been reconstructed.

In referring to allied cases or those falling somewhat under the same class we have numerous instances in the experience of practitioners of cases of osteitis and pereostitis followed by necrosis of bone, the formation of sequestrae and the necessity for various operative measures.

For the purpose of further drawing out the thought and experience of others and of making comparison of cases treated in a series of years in the past, I recall briefly some other cases I have treated, as follows:

Case II.—Mr. E., aged thirty-five years, strong and vigorous but of a strumous diathesis, was engaged in running a threshing machine, and in an effort to remove some chaff under the machine with his foot he slipped forward and bruised his shin bone on the coupling pole; but nothing much was thought of it at the time, simply using soothing lotions and continued with his work. The man, however, took down very soon after this injury with typhoid fever, and after some four weeks recovered from the same and was up and around, when his limb, which had been troubling him some in the meantime, now began to trouble him severely. It became oedematous and painful, and showed evidence of periosteal inflammation.

The history of the traumatic injury sustained prior to the attack of fever was now recalled. I made an exploration with a grooved needle, and the presence of pus was disclosed under the periosteum of the anterior aspect of the tibia at the point of original injury.

I at once made a free incision down to the bone and drew away a quantity of pus. On further examination and probing it was found that there was extensive osteitis and resulting necrosis along the anterior surface of the bone. An operation was decided upon for the removal of the necrosed portion of bone. He was accordingly put under an anaesthetic by an assistant, and I made an operation, making an incision four inches in length over the anterior aspect of the middle third of the tibia, extending the incision down to the bone and finding the same denuded of the periosteum over quite an area, and that a destructive osteitis

and resulting necrosis existed. It was also found that a sequestrum of bone some three inches in length had been formed, and this, with the surrounding ulcerating and necrosed osseous tissue, was removed and the cavity scraped out with a curette. This cavity was then packed with antiseptic gauze, the parts closed with sutures, proper bandaging, the dressings to be changed as required; the cavity was thus allowed to fill in gradually with healthy granulating tissue. Result was recovery with a good limb, but the cavity in the bone never filled out fully with osseous material, which is often noted in such cases.

Cases III and IV.—These represent minor cases and operations in a list of injuries among railway employes and others where there was necrosis of various bones of the hand and foot as the result of traumatic injury communicated to the periosteum or cancellous structure, resulting in suppuration, followed by necrosis and the necessity for excision.

This is very often the case in these bones. As well known, they are devoid of a nutrient artery and receive their blood supply and nutrition through the medium of the periosteal covering, and when this membrane is separated or destroyed death of the bone necessarily follows. Often before an operation will be submitted to for the excision of such necrosed bones there will be associated therewith troublesome cellulitis and pus formations under and about the sheaths and tendons of such hand and foot cases, requiring free drainage and careful management to prevent blood infection and serious constitutional results.

Osteitis and periosteal inflammation is usually excited by external violence or exposure to cold acting upon a constitution predisposed to the disease. The chief predisposing causes are the syphilitic, scrofulous and tubercular taint, rheumatism and defective nutrition. The bones generally the seat of inflammation are the ones most exposed to injury. Hence it occurs more frequently in the tibia among the long bones, and in the skull, sternum and ribs among the flat bones, and also in those of the hand and foot.

Acute osteo-myelitis, a grave disease, is a diffuse inflammation and suppuration of the medullary canal and cancellous structure of bone, with exfoliation of the periosteum as a special diagnostic feature. It may occur as the result of a fracture or following

amputations. There is marked constitutional symptoms, as fever, pain and swelling of the limb, and great danger of death from pyaemia in a few days. Cases, however may merge into the subacute and chronic forms, and recovery take place as in the case of the boy herein cited.

The diagnosis between osteal and periosteal inflammation and that of acute rheumatism, which often has to be made, will depend upon the nature and history of the attack; whether there are present or absent constitutional symptoms of rheumatism; whether or not there is a history of an injury to the part first invaded. The history of acute periosteal inflammation shows that it is liable to run very rapidly into suppuration, and with the further evidence of fluctuation, which, however, is not always easy to determine.

Acute osteo-myelitis develops more slowly in its course, and without the formation of pus under the periosteum, as the inflammation and suppuration are in the marrow and cancellous structure of the bone. There is generally a limitation of the swelling and inflammation to the section first attacked in periostitis and not passing beyond the joints, as in erysipelas; a history of marked constitutional symptoms, as fever and great pain, the latter especially acute at night. The foregoing symptoms, with other well-known diagnostic conditions, will serve without great difficulty to determine the nature of these cases.

The cancellous structure, or diploe, of the bones of the head are frequently the seat of inflammatory and suppurative action. Numerous examples no doubt could be cited by others where the cancellous structure of the frontal and the mastoid portion of the temporal bones have become infected as a secondary result of ear and nasal involvement, such cases resulting more often than is suspected in death from sepsis rather than uncomplicated meningeal inflammation.

I recall two cases of this class, in one of which I assisted in trephining down on the mastoid cells, finding them filled with pus and a necrotic condition of the cancellous structure existing, these two cases soon succumbing to septic poisoning. Two other striking cases of acute osteo-myelitis in the long bones were recently called to my attention by a physician who had knowledge of them. One case was that of a man who engaged in a

quarrel with his neighbor, a farmer, one man kicking the other on the leg and fracturing the tibial bone. Soon after this acute inflammation developed in the marrow of the injured bone, and the man died from pyaemic poison. The man who did the kicking was afterwards brought to trial and sentenced to prison, where he had ample time to think it all over. The other case was that of a small boy who was playing about the room in his home, and falling upon the floor he fractured the tibial bone. The limb was regularly set, but being of a strumous diathesis, one of the leading predisposing causes, he developed acute osteomyelitis in the fractured bone and died from pyaemia in a few days after the injury.

In the various pathological collections in museums and in the hospitals in both this country and in Europe there are to be seen innumerable clinical cases and pathological specimens covering the whole range of this subject, as I was permitted to see and investigate somewhat during the past summer. Such cases and exhibits illustrate the changes in the various stages and also the results of the formation of sequestration of bone and the part played by nature in an effort to repair the damages done, all of which is very interesting to those who have the opportunity and care to make the investigation.

In conclusion I would add that there can be no greater mistake made than to fail to recognize the various forms of osteitis and periosteal inflammation, and to counteract the evil results if possible by proper constitutional and local antiphlogistic measures. Drs. Pirogoff, Lidell and others who acknowledge the limitation of medicinal agents recommend, however, the administration of the iodide of potassium as of marked benefit in such cases.

When the various measures fail in their purpose to prevent inflammation, suppuration, we must be careful to locate early the point at which the first evidence of pus formation occurs, and by free incision of the tissues and, if necessary, trephining down to the bone marrow drain away the pus, and by further operation removing at the proper time all ulcerating and necrosed structures which would act as a central focus for further trouble. Otherwise the results to the important structures involved will be an almost irreparable damage, if not death to the patient.

DISCUSSION.

Dr. John C. Fulton, of Bluffton: My experience has been similar. It has come to my personal experience to have three cases of this kind, and two of them have developed bone in the shaft of the tibia after many years of painful life. A couple of years ago it was my misfortune to have a case of double osteomyelitis of the tibia of the left leg and the fibula of the right leg. The fibula of the right leg was taken out. In the left leg there were a number of fistulous tracts extending nearly to the knee, and when I operated I was compelled to use some of the tissues along these tracts to make a flap to cover the wound. He made a splendid recovery. I have had other cases, and I think the real question in these cases is the propriety of amputation. If the patient is very young the matter of time is of no consequence; but later in life, in the productive period, it is a question whether they can afford to spend four or five years waiting for this regeneration of bone. These thoughts come to me in connection with these cases, and it is a very interesting question.

Dr. C. K. Bruner, of Greenfield: The point I should like to emphasize is the unexpected regeneration in these cases. I do not think the doctor will be surprised at the regeneration of bone in the young after this experience. A few years since I saw in consultation an acute case of osteomyelitis only running a few weeks. When I made the incision I expected to find only the lower third of the tibia diseased, and I expected to scrape that out thoroughly and have the bone regenerated; but I found the entire shaft of the tibia necrosed, and I wanted to amputate before the boy got off the table. Consent was not obtained, however, on account of the absence of one of the parents, and I was compelled to do the best I could. I cleaned out the shaft of the tibia completely, leaving little strips and pieces of bone wherever I could. So badly were the tissues necrosed that I couldn't find sufficient flap to cover the wound, and I was compelled to pack the cavity. It was a long, tedious case, the pieces of bone left behind all exfoliating, but we have a complete regeneration of the bone, and the boy is as happy and gets around as lively as any boy I know of. In this case amputation would have saved a good deal of pain and trouble and time, and it would not have been bad surgery.

A few years previous to that a little girl, after exposure to wet and cold, developed osteomyelitis involving not only the bones of the tibia and fibula but also of the ankle, and in less than four weeks' time these bones were entirely necrosed. I think the patient would have died of acute sepsis if I had not amputated. In a number of other cases that have come under my observation I have had repair of the bone, and in those that are rapidly growing if I can save any part of the bone, even though I think it will exfoliate, I do so, and if I can not save any at all I save the periosteum, and I am satisfied we will have good results. I wouldn't think of amputation in the young in such cases if I have either a shell of bone or the periosteum.

Dr. Arthur Andrews: I saw a case last winter at Yorktown of about seven or eight days' standing. The periosteum was stripped free from the tibia the entire extent of the diaphysis, which I removed, leaving only a long sliver of bone attached to the periosteum. Four or five weeks later I was called to see the patient again. He had developed an osteomyelitis of the femur on the same side. There was a similar separation at the lower epiphyseal junction. I removed the entire shaft of the femur, including the head of the bone, as there was pus in the joint cavity. The boy recovered. Just what condition we are going to get there as far as regeneration of bone is concerned I do not know. I have not seen him since.

AESTIVO-AUTUMNAL FEVER.

BY G. D. MARSHALL, M. D., YOUNG AMERICA.

Of the definition, history and etiology of aestivo-autumnal fever I will not speak except as it applies to this particular epidemic, as it is an epidemic in the truest sense of the word. Aestivo-autumnal fever is mentioned in the text-books as a disease occurring in the tropical and subtropical countries, few cases being observed as far north as Indiana. C. J. Stedman reports a case in the Year Book of Medicine, volume 6, 1906 edition, occurring in midwinter in Alaska, in which the only manifestation was severe headache, occurring periodically and readily cured by quinine. The malarial plasmodia were found abundantly in the blood.

The appearance of this disease in Indiana must be accounted for by communication with tropical countries. This, however, is not hard to explain when we remember that every neighborhood furnished recruits during the Spanish-American war, and that regular soldiers lately returned from the Philippine islands and national guard were thrown together during the mobilization of troops at Fort Benjamin Harrison last fall.

The disease has been very prevalent since last October in this section, most people no doubt becoming infected in the fall, but the disease not developing enough to produce symptoms compelling them to seek medical advice until late in the winter, the epidemic reaching its maximum severity the last two weeks in February and the first two weeks in March.

Number of cases by months as they applied to me for treatment or as diagnosis was made were as follows: September, 2; October, 9; November, 30; December, 35; January, 25: February, 68; March, 66, making a total of 285 cases.

The blood was examined in the case of every patient before quinine was given. In many patients the blood has been examined four or five times at intervals.

The appearance of an epidemic of this disease in the winter

time is indeed enough to arouse one's curiosity, but the blood findings were so universally positive in results, together with the absence of the Widal reaction and the bacillus of Pfeiffer, makes the diagnosis positive. Again, the experience of patients who had suffered from grip when it was prevalent during the epidemic of that disease seventeen years ago and from this disease during the past winter can not be ignored, as they expressed themselves as having suffered from a different malady this winter from the one they had suffered from before.

Having examined blood from patients living in Kokomo, Marion, Bowling Green, Sullivan, Logansport, Galveston and Walton, and finding the parasite present I can not think the disease confined to my own neighborhood. Another thing that seemed to me to be significant was the statement of a traveling man who carried thermometers, that doctors complained they would not register above 98° F. As subnormal temperature has been so frequently noted, even as low as 96° F. when tested by four different thermometers, it was probably no fault in the instrument.

As medical knowledge has become cosmopolitan so have diseases, and the appearance of diseases in localities that were heretofore free from them is only a natural sequence of the rapid methods of conveying passengers and commodities. Tropical diseases are certainly going to occur with more frequency in the future than has been the case in the past. As to drainage and general sanitary conditions of the locality in which I practice, they will compare very favorably with any farming community in our country. The age of patients varied from ten months to eighty years. Sex seemed to have no influence.

As is the usual experience of physicians, most patients had made a diagnosis of their disease before applying for relief. This was governed by the most prominent symptoms at the time they came under a doctor's care. Where the patients had previously suffered from rheumatism they usually attributed the pains in the shoulder, sides, back and neck as due to that disease. Where the gastro-intestinal symptoms were the more severe it was indigestion to them, and so on through the whole category of human ills, reminding one of the six blind men of Hindoostan. All were partly in the right and all were in the wrong with the exception

of those complaining of rheumatism, as I do not believe this disease can occur in one suffering from malaria. In many families but one or two cases would be observed, with a varying interval of time between the occurrence of the disease in the different individuals. In some families perhaps one member was takn sick in the fall, and no more cases occurring until February or March, when the other members would be attacked one after the other in rather short intervals. This was not due to any infection active at the time, but due to the fact that when one or more members of a family are sick the task of nursing and doing the routine work involves more exertion on those members of the family able to be up, and as attacks were usually precipitated by exposure or exertion this accounts for the occurrence of several cases in some families in short succession, for we know that rest in bed is one of the great essentials in the treatment.

While many patients did not go to bed, yet the improvement in them was very slow, and treatment did not give the results as readily as where the patient was under proper control. Thus the febrile cases made a much more rapid recovery than the afebrile cases, who did not consider themselves sick enough to take to their beds but continued to drag around, many of whom were forced to go to bed after having suffered from general weakness and accompanying symptoms, and passing a miserable existence for from one to three months. Many would make the statement when first applying for treatment that they thought they could wear it out. This of course only gave the disease a firmer hold, and such patients usually had all the symptoms of chronic malaria.

The symptoms are very variable as regards acuteness of onset and activity. Some were taken with a chill or chilliness, followed by fever, nausea, vomiting of much bilious mucous, vertigo, headache (always frontal); some had local, some general pains. In others the development of the disease was insidious, and weakness, anorexia, vertigo, malaise and shifting pains were the first symptoms. Acute cases usually presented with a rather high temperature—101-104 degrees in adults and 103-105 degrees in children, although I saw cases for the first time when in a state of collapse and a temperature of 96 degrees, cyanotic, no radial pulse and with the appearance of impending death. It was not

the beginning of the disease but the collapse following overexertion, as was proven by the future history. The temperature usually continued at about the same degree for some time. One case had a temperature of 103°-104° for a week, and was receiving eighty-four grains of quinine daily (the patient was a boy fifteen years old), while some would have a high temperature for a short time only.

Subnormal temperature was much more frequently met with than normal or elevated temperatures. Several patients continued to go about with a temperature of 96° and a pulse of 60 for weeks, refusing to go to bed and ignoring the advice that such behavior on their part was dangerous. No doubt some of you will think the recording of such temperatures was the result of faulty technique, and a word about precautions taken to avoid this is but fair to any one hearing or reading this paper. Three, four and in some cases five thermometers were used on the same patient, giving them from five to ten minutes in which to register, and as every instrument had been tested by former use it seems there is no chance for dispute. A temperature of 97°-98° in a patient going about should arouse suspicion of this disease. The temperature was never hectic. There was no relation whatever between temperature and pulse rate. In one patient there would be a temperature of 103° and a pulse of 110, while the next patient might have a temperature of 103 and a pulse of 60. This was an actual experience, both patients about twenty-six years of age, one a male and the other a female, and the female had the slow pulse. There was nothing in the past history that could account for it, as both had enjoyed good health.

In some both temperature and pulse would be below normal. Again a slow pulse and fever would be encountered or a rapid pulse and subnormal temperature. The pulse was in some cases as low as 52, 54, 58, 60, etc. One patient, a boy of fourteen years, had a pulse of 54 at 12 a. m. March 1st, temperature 96.6°, pulse 52; temperature 97° at 8 p. m. and pulse 69; temperature 97° at noon March 2d. Strychnine arsenate, gr. 1-30, every two hours, and quinine, gr. VI, every three hours was given. This patient also had a large mitral regurgitation and was quite cyanotic. He recovered from every evidence of the disease except the anemia in a week's time.

The pulse often had a peculiar thrill, and a muffling of the first sound was often noted. The pulse was sometimes irregular, and this with the ever present dyspnea on exertion caused some to attribute their suffering to heart disease. Murmurs and irregularity disappeared under anti-malarial treatment.

Vertigo was complained of in over 90 per cent. of the cases, varying in severity from inability to stand to a sense of dizziness when suddenly changing position. Very few escaped this manifestation in some period of the disease.

There was no particular change in rate of respiration when patient was quiet. Gastro-intestinal symptoms were frequent and often very severe. Some would have a ravenous appetite and some no desire for food at all, forcing down enough to sustain them. This, like other symptoms, was quite changeable.

The tongue is always covered with a heavy white coat, indentation of the teeth showing at the edges. Exfoliation of patches on tongue and buccal surface often noted. In two cases there were very painful sloughs on tongue, tonsils and gums. The nausea was sometimes distressing, and lavage was the only thing that controlled it in three cases. Some vomited large quantities of bilious mucous: the amount was sometimes astonishing.

Constipation or diarrhoea was usually present, both very obstinate and requiring much attention. The liver and spleen were both usually quite sensitive to pressure or percussion. Enlargement of the organs was not marked, but pressure over them often occasioned severe pain.

Tympanitis was often quite extensive, one case resembling peritonitis, so severe were the symptoms. The stools were very offensive and often blood streaked, and containing much mucous. Coryza, pharyngitis and bronchitis were frequent symptoms. Dry, hacking cough was quite annoying. Stimulating expectorants usually produced a profuse muco purulent discharge from the respiratory mucosa. Scanty urine and a mild cystitis, with a urine of high specific gravity and heavily loaded with urates, occurred in quite a large percentage of cases. Conjunctivitis was frequent and a yellow discoloration of sclera was almost constant. The skin presented a yellowish, muddy and cachectic appearance. Herpes, acne and urticara, followed by exfoliation of epidermis, was frequent. One patient had a dis-

coloration of skin looking like first stage of purpura hemorrhagica. Prurites and burning was sometimes intense, depriving the patient of all rest for days.

One patient had typical herpes zoster and suffered most excruciating agony. On one occasion I gave him hyocine hydrobromate gr. 1-100, morphine sulph. gr. ¼, by hypodermic, and it was forty minutes before the pain began to subside. As I had used the same drugs for producing surgical anaesthesia I know they were potent.

The calloused skin from the palmar and plantar surfaces all peeled off in many instances, and epidermis from covered surfaces would peel off in flakes. The amount of pain suffered differed greatly, as did the location of it. The right shoulder was often the location of pain corresponding to distribution of circumflex nerves. The pains, except those of the liver, spleen and stomach, are the result of neurites.

The posterior divisions of the spinal nerves are very sensitive to pressure; pain in the neck, while simulating the muscular pains of follicular tonsilitis, could be easily distinguished from these by careful examination, as the muscles were not sensitive to pressure, but when pressure was made on the cervical, sympathetic ganglia the pain was pronounced and of a sickening character. The same condition existed in all the spinal nerves and gave rise to pain in the back.

Pains running to extremities of the limbs were frequently complained of, and paresthesias, as formication and numbness, was another manifestation of the neuritis. Pain in the feet to such a degree that the patient could not stand, or in severe cases even wear socks, occurred in a few cases.

Forgetfulness, mental apathy, delirium, hallucinations and irritability were psychical manifestations. One case had chorea, which readily yielded to anti-malarial treatment. Several patients asked me if they were losing their minds or if their mental disturbance was due to the disease, some being quite melancholy. Sweating is often profuse and of an offensive, measle-like odor.

DIAGNOSIS.

A symptom complex embracing one or more of the symptoms just spoken of should arouse suspicion of malaria.

The microscope should always be used in making a diagnosis. The therapeutic test is not sufficient, as some cases yield very slowly, and as absorption is almost at a standstill the testimony of drugs may be deceiving.

The maxim that "any fever that does not yield to quinine in four days is not malaria" will not hold good here. The parasites can be demonstrated in the blood in great numbers after quinine has been administered in good doses for months; consequently patients are subject to recurrences as a result of any bodily or mental fatigue or exposure.

This should be especially considered where patients have been the victims of measles, mumps or other acute infectious diseases. Latent malaria will develop under these conditions and confuse the physician, who can not see why his patient does not regain his health when all symptoms of the acute disease have disappeared and the patient continues much debilitated. Examination of the blood shows parasites in different stages of development. The hyaline bodies occupy but a small part of the cell, and are eccentrically located, and may be seen just inside the cell wall, changing positions much like an imprisoned animal. They do not change in size and shape in changing the focus, but become more or less plainly visible, which serves to distinguish them from artefacts, which are much larger and occupy the center of the cell, but change in size with change in focus. Their motion is wavy, and they do not change from one part of the cell to another. They may be triangular or rod shaped, but close observation will distinguish them from the real bodies.

The intra-cellular organisms stain very well with a saturated solution methylene blue in normal salt solution. Crescents were much more frequently observed in the fall and winter than now. Extra cellular bodies are very numerous, and are of different sizes and shapes. Small pigmented, rapidly moving bodies are the most numerous in unstained specimens. These will be hyaline in appearance for a time, then by whirling over they will present a bluish color. Rod shaped bodies are sometimes very numerous, which have a rapid, whirling motion, appearing as a

round body when whirling on end and showing their cylindrical shape when assuming the horizontal position. These bodies are about the length of the diameter of a red blood cell. They are called micro-games, and are considered to be broken off flagellum free in the blood.

Flagellated forms are present in almost every case. They are about one-fifth the size of a red cell and have active motion. The number of parasites found in the blood is often astonishing. In some specimens they outnumber the red cells as about 20 to 1.

In stained specimens red cells with a lacerated capsule and with organisms just making their escape are often seen. These organisms take the nuclear stain and have the appearance of being spilled out of the cells. They are also observed when within the cell. Pigmented leucocytes are quite plenty. Leucocytes in ameboid motion may be observed several hours after blood is drawn. The leucocytes show a tendency to gather in groups, and often present the appearance of large ameba.

There seems to be a relative increase in the number of large mono nucleus. The resistance of the malarial parasite against changes of temperature is astonishing. Specimens have shown active motion after having been exposed to a temperature below 30° F. for several hours in a slide preparation.

They will live and multiply for weeks where the cover glass is sealed around its circumference with vaseline or liquid asphaltum. Warming in the sunlight seems to be much more agreeable to them than warming by artificial heat. Staining with methylene blue does not affect the length of time they will remain active. Stains, poisons, methy-violet is very satisfactory for dried blood, having the advantage of requiring but one stain. Phleuns sol. does very well, but is unstable, and it is hard to get the exact proportion desired, for some preparations of it are useless. Puncturing through a drop of a saturated solution methylene blue in normal saline gives good results, as it holds the blood cells in a better condition, especially if the specimen is air-tight. Puncture through a drop of phleuns sol. is also satisfactory if the stain is good. This method gives a clean specimen, for with a clean slide and cover glass and clean skin there is no dust or other extraneous matter to confuse.

Eosin and hematoxylin or eosin and methylene blue may be

used, but possess no advantage over those just mentioned. Some persons will carry the parasite of malaria in the blood for months and not suffer from any symptoms of the disease. This certainly establishes latent infection and accounts for the occurrence of symptoms at any season of the year.

TREATMENT.

Rest in bed is to be desired and is imperative where a low temperature has existed for any length of time.

I believe the patients can select a diet better than it can be done for them. Acid fruits are usually very agreeable. Quinine is of course the most effective drug, given in combination with capsicum after meals. The following is a good method of administration: Quinine one ounce, Hlel one drachm, fld. ext. capsicum one drachm, glycerine one drachm, make into pills and put in capsules eighty. Give one or two capsules after meals. Stick five or six pinholes in capsule before giving.

Dusting capsules with precipitated phosphate of calcium will keep them from sticking together in warm weather. Calomel to cleanse the bowel before the administration of quinine and a calomel purge to release the conjested liver is indicated. Pain in liver is quite readily relieved by a calomel purge. Iron, arsenic and strychnine are indicated to combat anemia and debility; alkaline digestives to stimulate the gastro-intestinal tract is helpful. Camphor and chloral in alcoholic solution is useful in relieving the pruritis. Methylene blue may be used where quinine can not be taken, and I have secured a good result with this drug in two cases. Just how it acts I do not know, as it does not seem to affect the parasites much when used as a stain. The statements frequently noted in text-books and medical journals that malaria yields readily to treatment is subject to many exceptions. Clearing the blood of the parasites is a mission which I have been unable to accomplish, and I do not think I am alone in this deficiency, as I have examined blood of patients that have been treated by other physicians for malaria and discharged as cured in which the parasites were numerous and the patient still complaining of debility and headache, with occasional attacks of vertigo. As I have been afflicted with this disease myself since last October and have taken large doses of quinine almost daily

ever since, together with methylene blue, arsenic, iron and capsicum, the parasites are very numerous in my blood, and as soon as quinine is discontinued for a few days symptoms develop, such as vertigo, chills and fever, headache and pains. While many criticisms of the practice of dosing patients with quinine "ad nauseam" are to be seen in the literature, from a personal point of view I prefer the quinine to the symptoms of the disease.

Prophylactic doses of quinine daily, preferably taken after the evening meal, should be given a long time after acute symptoms have disappeared. The dose should be regulated to suit the individual, as there is a great difference in individual susceptibility to both malaria and quinine. Quinine should be given to women before confinement or to persons who are to submit to surgical operations, for a week or ten days before the expected shock, where they have had malaria but have apparently recovered from it.

SUMMARIES AND CONCLUSIONS.

The foregoing is a brief statement of personal observations, having purposely avoided quotations from the literature, which is as accessible to other physicians as myself, the mission desired of this paper to be to call the attention of the profession to a disease occurring here as an epidemic, probably for the first time, and at a season of the year when it is least expected. The only observations which I have noted that do not occur in the literature are: The length of time the parasites live outside the body in sealed cover and slide preparations; their persistence in the peripheral blood in such vast numbers; the offensive odor of the perspiration of patients; the peculiar skin lesions, viz., urticaria, papules, sloughs of skin and mucous membranes and exfoliation of epidermis; the frequency of the algid form in this epidemic; the frequency of neuritis in some form, this symptom occurring in about 90 per cent. of the cases.

There have been no deaths from this disease in my practice, although it was a complication in three instances, as follows: (I) Rodent ulcer where all repairative processes stopped after malarial infection. (II) Diabetes mellitus, causing death by coma; this patient also had a palmar abscess. (III) Alcoholism, patient dying from acute dilatation of heart, probably precipi-

tated by a period of total abstinence where patient had been a heavy drinker. Malaria seems to destroy the desire for both alcoholic drinks and tobacco. Sequela usually following acute infectious diseases were entirely absent, and there was not a case of middle ear inflammation, pneumonia, nephritis, meningitis or inflammation of accessory sinuses.

Patients with tuberculosis did not seem to suffer any more than those previously in good health, the severer cases occurring in people that had been robust.

Quinine controls the symptoms, but is very slow about ridding the blood of the parasites, as I have not succeeded in doing so as yet.

As new cases are applying for relief almost daily, and many that have been relieved of their symptoms still carry the parasites in their blood, the effect mosquitos will have on the disease in the next six months may be watched with interest.

DISCUSSION.

Dr. Curtis Bland: The writer certainly should be complimented upon the paper, and should congratulate himself for having had this number of experiences. Down in Greensburg the cases of malaria of any type are very rare. I had only two cases last year, both of which were contracted in Arkansas, and these cases presented a difficulty in the matter of diagnosis. Frequently we find the symptoms very much the same as those of typhoid, and the only possible method of differentiating is by the use of the microscope, aided by therapeutic tests—the use of quinine, under the influence of which you can know in most cases.

Dr. Marshall: I had one case which was the cause of a great deal of contention. This was the most marked severe case of any case that occurred there, but I think this was due to the fact that it did not receive any anti-malarial treatment for a long while. The patient took sick in September and was doctored for three months or over for typhoid fever, at which time, as I got the history afterwards, he suffered bilious vomiting and also from jaundice symptoms, and then after three months of this he was able to walk up to town, and then suffered a relapse, and when he took down this time he suffered from a severe pain in the left

side. In this case it was diagnosed as renal calculus. I saw him three weeks later and gave him a hypodermic injection and made an examination. An examination of the blood showed no parasites; an examination of the urine showed that the urine was normal, and I could get no history of any renal disturbances. However, this case was treated for three weeks longer for renal calculus, at which time another examination was made, and the same conditions were found as in the previous examination. There was a pain in the back when pressure was made over the ganglia. Another distinctive feature was that when the person would get tired from one position there would be severe pain, and if the position of the body were changed it would give relief. Some thought that he was suffering from heart disease and pleurisy on account of the pain in the side, but this was misleading. Any pressure over the liver or spleen would elicit pain. The therapeutic test proved the diagnosis.

WHAT DO WE MEAN BY CATARRH?

BY G. A. WHITLEDGE, OF ANDERSON.

To attempt to encompass the limits of this subject into the brief space of one short paper would be utterly impossible, as you are well aware. Therefore, to treat the subject with brief consideration and to bring out a few points that are perhaps overlooked is all I shall endeavor at this time.

In view of the fact that most every general practitioner treats what is commonly designated as catarrh, I thought it might be of some general interest to discuss this subject. It is not my purpose to go into the more specialized technique of the subject as practiced by those of us who limit our professional efforts to these special branches of the practice of medicine, but to take up those conditions as observed by the general practitioner.

We hear a great deal about catarrh. I am interrogated every few days with the common expression, "Can you cure catarrh?" I feel safe in the assertion that 90 per cent. of your patients will tell you that they are the subjects of catarrh, affecting this, that or the other organ of their economy. These poor souls are in a measure to be pitied. They have gotten the greater part of their information upon this subject from the "lay press." From the pages of the daily newspapers they have studied the symptoms of various catarrhal conditions until they are thoroughly convinced that their affliction is identical in symptomatology to the numerous histories of cases published in these papers. I repeat that those otherwise intelligent human beings have gotten the greater portion of their information from the lay press, for I should dislike to believe that any brother practitioner of today would sacrifice a diagnosis and jeopardize his reputation by putting a patient off with the "misnomer" statement that he or she has catarrh.

I assume that there are none present who have been guilty of giving such advice. If you have done so, did you ever stop for a

second and ask yourself this question: Does the patient understand or know from my declaration what his infirmity or malady is? In fact, could you give him a true description of his disease, which you have been pleased to denominate as "catarrh?" I think I can answer, and with every regard for you as practitioners, that you could not.

So I say what do we mean by catarrh? We are like the layman, the unconscious victim of the patent medicine advertiser, in that we have appropriated his classification to every condition giving rise to a discharge as "catarrh." Therefore permit me to suggest that in the future let us give to these different conditions their proper classification, thereby conveying to the patient's mind a degree of intelligence, and at the same time direct to ourselves the appellation, scientific men.

With this brief introduction I come to consider the subject of the paper.

The word catarrh means, as you all know, to flow or a running down, "an inflammatory affection of any mucous membrane in which there are congestion, swelling and an alteration in the quantity and quality of mucus secreted." In the nasal chamber and its accessory territory we find various pathological conditions, most of which give rise to a discharge from the nose.

But the term catarrh does not express the pathology present; neither does it localize or differentiate the character of the disorder; it only defines one of the symptoms of the disease. This symptom, or this catarrh, as we are disposed to call it, is present in nearly every diseased process from an ordinary coryza to the most necrotic affections known to nasal surgery. So we see again that catarrh has really no scientific basis. And at this point I will take the liberty to make this statement, that there are exceedingly few instances in which a catarrhal discharge emanates from an otherwise healthy schneiderian membrane. An ordinary acute coryza may be referred to as perhaps the most prominent exception to the foregoing statement.

I shall only attempt to consider in this brief outline the commoner forms of pathological processes met with in this locality, and must ask you to bear in mind that each of these conditions of which I shall speak and those with which we commonly meet have each a definite pathology, but a symptomatology fairly com-

mon to all. Granting that the above proposition is true, differentiation must be arrived at largely through objective methods.

I will also here state a proposition preliminary to what is presently to follow, i. e., that the vast majority of nasal diseases are surgical conditions, and are not affections which can be successfully relieved by sprays, nebulizers and kindred appliances so frequently made use of by some in a quasi-scientific attempt to cure these patients. While I must emphasize my previous statement that these disorders are largely surgical, I acknowledge that a few of the simpler affections in this locality may be cured by local medication.

Let us next inquire what the real or pathological causes are in these various manifestations of the conditions known and commonly designated as catarrh. Recall, if you please, the picture that is familiar to all, the infant with a constant running nose, who is said to take cold easily, who sniffles and snores with every respiratory effort, who carries on the breathing function through the mouth instead of through the nose, who has frequent attacks of earache, with a suppurating otitis and perhaps permanent destruction of its tympanic membranes, and who worries through long nights, tossing, gasping and fighting for enough oxygen to sustain life, and why? Because this little patient has its nasopharynx blocked with a mass of adenoid tissue and a pair of large tonsils, establishing perfect mechanical obstruction to normal respiration. The only evidence you see on casual observation of this condition of so-called catarrh is a snotty nose. Do you think this pathological state can be corrected by simple local medication?

Yet we sometimes pass them by with an atomizer and a bottle of glyco-thymoline to the watchful care of a kind Providence. These, gentlemen, are purely surgical cases, and we are criminal when we refuse them the relief that can be afforded. So the sequence continues to the true hypertrophic conditions found in the nasal cavities later in life. These will complain of permanent or alternating nasal obstructions, with inability to breathe through the nose freely. This may be a true hypertrophy or a vascular dilatation, giving expression, however, to practically the same train of symptoms. This condition of the turbinates and mucous membrane of the nasal chamber will be accompanied by

the usual discharge, and the patient says, and perhaps the doctor, too, that he has catarrh.

Do you believe that Dobell's gaultheria, alboline and similar products will cure or remove the pathology present here? No, this will again require the intervention of some surgical technique properly selected to give relief.

Taking a very general view of other conditions giving expression to a similar symptomatology as the above, we would include polypii, exostoses, enchondromata, septal deflections, etc. These will attract notice in the following manner: difficult nasal respiration, discharge from the anterior or posterior nares, headache localized in different parts of the head, reflex nervous and eye symptoms. The above represent a group of morbid entities, each presenting its own definite pathology, each representing a distinct disorder and requiring its own special treatment for relief. Yet these are all "catarrh."

While the various types herein referred to are perhaps the most common forms of so-called "catarrh," and are afflictions from which a large per cent. of our population suffer in some degree, there are others less often recognized and really more important types which demand our most serious consideration. I refer to the chronic suppurative diseases of the accessory sinuses of this territory. Many of these suppurating cavities go on for years undiagnosed and untreated. These are the types of so-called catarrh, gentlemen, that produce physical and mental invalids, hypochondriacs and not infrequently suicides. These even represent a class with whom we work long and faithfully in our efforts to relieve, but finally give up and relegate them to the list of hysterics.

This territory is represented by the maxillary sinuses, the frontal, anterior and posterior ethmoids and the sphenoids. All these communicate with the nasal fossae, and are subject to the same infectious agents as the nasal mucosa. The chronic suppurations with which these cavities are often affected results either from an extension of an acute infection in the nose proper or through extensions from some neighboring disease, as a decayed tooth, syphilitic necroses, etc. Timely recognition of the suppurative processes involving this territory and its efficient treatment is one of the most important achievements of nasal surgery.

I can not consider in this connection the direct and differential diagnoses of this class of nasal disorders; suffice it to say that in those sinus cases some of the prominent symptoms present in the types of nasal catarrhs previously referred to may be entirely absent or excite only indifferent notice. Obstruction to nasal breathing may not be complained of. The discharge may be scanty and unnoticeable in quantity, but the odor, which is nearly always present, may be the only local symptom attracting your attention to these parts. The constitutional symptoms, however, in this phase of so-called nasal catarrh are worthy of our closest scrutiny. These are the cases, gentlemen, whose symptomatology may misdirect your efforts at relief.

In the typical cases of this nature (and it is the typical case that we usually attempt to interpret) we have, as referred to earlier in the paper, the physical and mental invalid, the hypochondriac, inability to exercise normal mental activity, headaches located in various parts of the cranium, general depression, and lastly the chronic who is never sick or ever well. Why? The reason for it all is plain. When we find a pus cavity inadequately drained we can easily interpret the picture of a chronic septic state. So I inquire again, what do we mean by catarrh? Do we mean adenoids and tonsils? Do we mean hypertrophys, polypii, septal growths and deflections or accessory sinus disease? It's up to you to explain—I can not.

In brief conclusion allow me to suggest: Do not be prejudiced against the diseases peculiar to this locality and refuse them the courtesy and consideration to which they are entitled, but accord them due respect, investigate their character, find where they are located. Then we will understand "what we mean by catarrh." (Discussion is considered with paper of Dr. Spohn, which follows.)

COUGH, ITS ETIOLOGY AND TREATMENT.

BY GEORGE M. SPOHN, M. D., OF ELKHART.

Nature is generally conservative. She makes provisions for accidents and obstructions to her normal functions. Sensitive nerves are placed in certain positions as signals to warn the nerve centers of danger. Cough, sneezing and hiccough are some of nature's means to free herself of danger. The infant, the adult, the aged, and, in fact, all classes of people cough. Even the lower animals resort to it for relief in many diseases. It is not a disease, but rather a symptom. True, if allowed to continue unchecked in many cases it may lead to disease.

Coughing is generally caused by some irritant in the region of the distribution of the pneumogastric nerve. The irritation may be direct, as the inhalation of dust upon the laryngeal mucous membrane, or reflex, as the touching of the ear drum. Coughing is a violent expulsion of air from the lungs for the purpose of throwing off the irritant. Coughs are divided, depending upon the name or region of the afferent impulse.

In an ear cough, due to an accumulation of cerumen, relief can be had by coughing, which causes a contraction of the muscles, thus throwing off the offending body. In a throat cough, due to a suppurating tonsil, the coughing will cause a rupture of the abscess. In a laryngeal cough, due to dust upon the mucous membrane, the hard explosions of air will throw off the foreign body and thus protect the lungs. The bronchial cough dislodges exudates in the tubes. The pleural cough establishes better circulation in the pleural cavity. It also overcomes pain by the intensity of the intercostal muscles. The heart cough stimulates the cardiac nerves, causes deeper inhalations, and thus supplies more oxygen to the system. The stomach cough causes eructations of gases, relieves the pressure against the diaphragm and heart, increases peristalsis, and thus relieves many disturbing symptoms. The liver cough relieves biliary congestion by stimulating the portal circulation and opening the ducts. The anaemic

cough is the cry of the general system for more red corpuscles and haemaglobin. It frees the bronchioles and air vesicles of detritus, stimulates the circulation, and in this way adds to the blood more oxygen, the essential element to overcome anaemia. In the same way does the spleen and all the other organs influenced by the vagus nerve appeal to the cough center for relief of irritants. It is one of the methods to which nature resorts to relieve herself of those things that interfere with her physiological functions.

The cough center is in the medulla oblongata, near the respiratory center. All the impulses, whether afferent or efferent—passing between the brain and cord—must pass through the medulia. Coughing is controlled by the pneumogastric nerve and its plexuses. The origin of the vagus is in the floor of the fourth ventricle, passing out of the skull at the jugular foramen and down on each side of the neck. It sends branches to the ears, pharynx, larynx, pleura, trachea, lungs, bronchi, heart, stomach, spleen, pancreas, liver and intestines. It receives branches from the spinal accessory, facial, hypoglossal and anterior branches of the first and second cervical nerves. It assists in forming the pharyngeal, laryngeal, pulmonary, esophageal and cardiac plexuses. It is both a nerve of sensation and motion.

The superior laryngeal is a very important branch of the vagus. Supplying sensation to the larynx, it is very essential to the preservation of the lungs. The mucous membrane is so extremely sensitive that the smallest particle of foreign matter causes a cough. Thus nothing is allowed to enter the trachea that is irritating to the lungs. When cold and dry air comes in contact with the pharynx, the afferent impulse is carried to the cough center by the superior laryngeal, and the efferent impulse is returned by the intercostal and abdominal nerves. In such a case cough causes the mouth to be closed at least in part and normal moisture to be re-established. The same principle is true in all the organs that are supplied by the pneumogastric nerve.

There are many remedies in the market for the treatment of cough. It is surprising to read the various articles upon cough remedies and note how they are recommended by physicians. Nor are they all by the minor lights of the profession. Commercialism often leads men very near the line of imprudence.

There are three important groups of medicines—bitter tonics, as quinine, strychnine, etc.; sedatives, as opium, its derivatives, chloroform, etc., and antiseptic relaxants, as guiacol, ammoniae, etc. Practically all medicines for the relief of cough can be classed in one of these groups.

The promiscuous methods of taking cough syrups without knowing the cause of the cough should be discouraged. Medicines are useful if indicated. Remove the cause and the system will overcome the pathological condition. As previously stated, a cough is brought on for a purpose. If the cause is in the liver or intestines the ordinary mixtures would be injurious, while a cathartic might give relief. About 95 per cent. of all coughs have their seat of trouble in the respiratory organs. Perhaps this is the reason that physicians are sometimes negligent in their diagnosis. Pharmaceutical houses have simplified the work of the physician, but have they added any to his education?

Medicines will often hold a cough in check until nature removes the cause and establishes a cure. A constant cough is harassing to the whole system, and especially irritating to the respiratory organs. There are some conditions, as the advanced stages of tuberculosis, intercostal pain, etc., where heroin, codein or some sedative is indispensable. With so many sedatives in the market it requires no skill to stop a cough. A fool can stop a dog's midnight bark by killing the animal, but it often requires intelligence to stop the bark without friction. Medicines can be carried so far that the whole system becomes disorganized; but the fault does not lie in the medicines.

As stated before, the cough center is in the medulla and near the respiratory center. Now, anything that satisfies the cough center will stop a cough. A sedative benumbs; it dulls the sensibility. The medical method of treatment does not appeal to the writer as scientific, philosophical, and much less physiological.

Based upon the principle of applying medicines to the diseased parts, inhalers and inhalants are employed by many physicians with marked success. In fact, the market is well supplied with apparatus and devices for local treatment. The method should appeal to a patient as reasonable, because it carries the medicines directly to the affected parts. It has always seemed to the writer that the good accomplished has depended more upon the me-

chanical action, which has increased the amount of oxygen in the system, than upon the medicines inhaled. The inhalations of vapors, medicated hot and cold air are all useful, especially in chronic conditions; but the deep inhalations, where the air vesicles and bronchioles are dilated and all the muscles of the chest are drawn tense, much better results are attained. The normal atmospheric pressure is about fifteen (15) pounds to the square inch in the lungs. Now, if the patient inhales from a tank with a pressure of twenty-five (25) pounds to the square inch the bronchial tubes will be cleared of all exudates, the heart stimulated and the patient will have a buoyant feeling that can not be had only by adding more oxygen to the blood.

There are very few coughs that can not be relieved by proper breathing. He who breathes sufficient pure air into the lungs that the blood has at all times an ample amount of oxygen; he who breathes deep and normally that the bronchioles and air vesicles are cleared of all exudates will rarely or ever have any disease of the respiratory organs. And why? Because no culture field can be had in the lungs with a normal anatomy and normal functions. A pathological state must exist before the pneumococci, the tubercular bacilli, the streptococci or any other bacteria can propagate. The prophylactic to cough is proper, deep breathing. If this prevents cough then it should rightly be prescribed when cough already exists. To cease breathing when the lung is empty will not stop a cough; but to hold the breath with the lungs filled with air stops the cough. The writer habitually instructs the patient to breathe slowly five or six times through the nose, and each time hold the breath as long as convenient, and then exhale slowly through the mouth. The first inhalations seem to irritate and cause a cough, especially if the patient has pain or is not in good humor. It is a question of educating the patient how to breathe so as to stop the cough. It requires patience and perseverance. Generally from three to six long and easy inhalations will satisfy the cough center, so that the desire for cough ceases. If there is an exudate upon the mucous membrane, a plug in the bronchioles, an excessive dryness in the air vesicles or in the larynx, or any irritation, the long and deep inhalations will cause nature to throw out a moisture at the offending spot and thus satisfy the cough center by removing the

irritation. In this way serum is added to the exudate, so that it is easily removed. It often requires long and exhausting coughing to accomplish the same results that can be had by simple deep breathing. Coughing causes the mucous membrane to become tense and dry, so that mucous exudes very slowly. Also the rapid inhalation of cold air, as in the act of coughing, dries the moisture upon the mucous membranes, and thus often adds to the irritation. While deep nasal inhalations stimulate the action of the heart, more blood is driven to the affected parts, the air vesicles and bronchioles are dilated, and then followed with relaxation, so that the serum passes freely through the membrane, removing the irritation, and thus the desire for cough is removed by satisfying the cough center. This can easily be proven. An irritation of the pharynx or larynx, causing a violent cough, would be made worse by inhaling cold, dry air through the mouth; but the inhalation of vapor from hot water through the nose will quiet it nicely.

This also shows that nature shuns a dry mucous membrane. The arrangement of its epithelial layer shows that its surface must be moist to do its normal functions. Moisture is absolutely essential in the air vesicles that the carbon dioxide can pass out into the exhaled air and that the oxygen can pass sufficiently into the blood. An irritant can easily be expelled if the mucous membrane has sufficient moisture. A "tight cough" means lack of moisture. To "loosen a cough" more serum must come in contact with the offending point. When a patient once learns how to breathe and establish the normal moisture he will rarely, if ever, have a cough.

There are still some who cling to the old and erroneous idea that sputum is the waste of impure blood, and must be thrown off. Such cases are opportunities for the physician to inform them that when a cough exists there is an abnormal state.

In diseases of the mucous membranes, from the tip of the nose to the air vesicles, there is a stage of resolution which does not mean coughing, but returning to its normal state. During this stage the exudate can be thrown off without cough. The expectoration in pneumonia or any disease of the respiratory organs can be thrown off much more easily and more quickly by deep breathing of pure air than by cough. It does not look plausible to one who has never tried the remedy.

There are those who affirm that deep inhalations in pneumonia, in tuberculosis, etc., are detrimental, and that the lungs should be kept as quiet as possible. This has not been the experience of those who have practiced deep nasal breathing. A remedy that will establish the normal status of the lungs, and in this way destroy the culture field for bacteria, should appeal to one as more scientific than a large dose of a depressing medicine.

The inhalation treatment is not new for the treatment of cough. Those who practice it become enthusiastic over its results. Success depends upon the efforts of the patient, who often becomes indifferent to any suggestion, only the old stereotyped method of taking medicine.

It is the experience of rhinologists that cold and dry air, through the mouth to the pharynx and lungs, is the cause of very many coughs. The chronic, obstinate variety are largely due to mouth breathing. It may occasionally become a habit, but necessity compels most cases to breathe through the mouth because of some nasal obstructions. Many cases are not aware of their lack of nasal respiration, but an examination of the pharynx will verify their conditions. Being deceived so often, the writer has made it a rule to depend upon his own findings rather than upon the opinion of the patient. Many who can breathe through the nose in the upright are mouth breathers in the reclining position.

If the patient is instructed to breathe through the nose at all times, and it is practiced, a cough can easily be controlled and many times can be cured with no other remedy. It is a bad habit to run or walk with the mouth open. A brisk walk with the mouth closed will compel one to take long and deep inhalations through the nose, thus supplying more oxygen to the blood.

Obstructions in the pharynx or nasal passages that hinder proper nasal breathing should be removed.

The question may arise how can mouth breathing cause a cough? All air should be moist, warm and filtered before passing to the larynx and lungs. It has been estimated that in an adult every twenty-four hours from one to one and one-half pints of serum is thrown off by the nasal mucous membrane. This should be taken up by the inhaled air and carried to the pharynx, larynx and lungs. Normal respiration can only be carried on when the mucous membrane receives the warm, moist air. The

serum from the Schneiderian membrane is aseptic, and in pharyngitis and laryngitis is far superior to any prepared gargle or spray. The error sometimes made in treating a pharyngitis or laryngitis causing cough is to make the throat the objective point. The nose should be treated that the patient can have ample air through the nose. Nasal breathing is not only preventive, but where cough already exists, if properly practiced, is curative. Without the normal moisture the respiratory mucous membrane becomes dry and irritated. The air vesicles lacking in moisture, proper osmosis can not be carried on. The ideal treatment in any disease is to restore the system to its physiological functions. Nasal breathing is normal, but mouth breathing is abnormal.

Conclusion:

1. Coughing is an effort of nature to free herself of some irritant.
2. Cough may be direct or reflex.
3. Proper differential diagnosis should dictate the correct treatment.
4. Medicines are divided into tonics, sedatives and relaxants.
5. Sedatives and relaxants are indicated in acute, and relaxants and tonics in chronic cough.
6. That which will satisfy the cough center will cure a cough.
7. If one understands how to breathe, cough is generally unnecessary.
8. Proper breathing is the remedy par excellence for cough.
9. All obstructions should be removed from the nose and throat that interfere with proper nasal breathing.
10. A clear and open nose indicates a clear brain, good respiration and generally good health.

DISCUSSION.

L. C. Cline: This paper on catarrh seems to me to be very important. I tell my students that when they wash their hands and face it doesn't matter much what kind of soap they use so they get themselves clean, and it is the same way with catarrh. Spraying the nose is a means of cleaning the nose and of making the parts clean. When you have catarrhal trouble, for instance in

children, you invariably have some lesions. You will find that you will have hypertrophied lymphoid tissue. When a child is brought to me I invariably look for the lymphoid tissue. The tonsils are usually affected, but I do not have to go far before I find the trouble. Many physicians treat this disease without finding what the trouble is. In adenoids we have a very different proposition. Surgery does apply to the adenoids. In many cases you will find that overfed people are suffering from indigestion, and this leaves a bad condition in the nose. Now these people are eating more than they can digest; they are causing uric acid to form in the blood. These people should stop eating so much; they should be put on half rations and the alimentary tract should be stimulated. There are many cases that should be operated on. But there are also a great many cases that do not need to be operated on; they simply need hygienic treatment; the habits of life should be regulated; in this way we get rid of a great many operations. There is no question about it in my mind; I have tried this over and over again. In many cases operation is all right, but if we can control a case without operating on it, if we can control it with general hygienic measures it is still better. In the case of children we will have to operate on the majority of them. In most cases in children you will find that the adenoids are the cause of the catarrh and ear trouble. Nothing but a surgical operation will relieve these cases; there is no use spraying them, but operate on them and send them home cured and happy.

Dr. Albert E. Bulson, Jr., Fort Wayne, Ind.: The opinions expressed in the paper very largely coincide with my own views. In children the so-called "catarrh" is due to adenoids and enlarged tonsils in fully 90 per cent. of all cases. Relief can only be secured by the thorough surgical removal of these growths. It is unfortunate that so many incomplete operations for the removal of adenoids and tonsils have been performed. Some relief is obtained by clipping off that portion of the enlarged tonsil which projects into the orapharynx and removing as much adenoid tissue as may be cut out with one sweep of a Gottstein curette, but that does not constitute a complete and satisfactory operation nor bring about such results as are possible. Children

who have an incomplete operation usually continue to suffer in greater or less extent from general ill health, repeated colds, earache and perhaps discharging ears, with all the dangers attending such complications. No physician, however skillful, can thoroughly remove tonsils and adenoids in the vast majority of cases unless the patient is under the effects of a general anaesthetic. A screaming, struggling child renders careful and thorough operative procedures practically an impossibility, and particularly so when the mouth fills with blood following the first disturbance of the diseased tissues. The operation should be done under general anaesthesia, with the head and body turned to the side and slightly downward to facilitate draining of the blood from the mouth, and under good illumination so that the operator can see exactly what he is doing. The portion of tonsil high up between the pillars of the fauces, so often left by many operators, should be removed, as that portion is most likely to keep up trouble. Following the operation the child should be put under proper hygienic conditions and due attention given to dietary. Stuffy and illy ventilated sleeping rooms and a diet composed largely of sweets is responsible for many cases of nasal catarrh and a return of abnormal conditions after removal by surgical means.

Cough is only a symptom and should never be treated as such. Treat that which produces the cough. I have known of a persistent cough being due entirely to impacted cerumen in the ear. We also have the smoker's cough, the whisky cough and the cough due to various reflex disturbances. Deep breathing will never cure such coughs. The cough of a consumptive usually serves a purpose, as it enables the patient to raise from the lungs muco-purulent material which, if retained, would only increase the infection already present. Furthermore, I disagree with the essayist as to the propriety of advising consumptives to breathe deeply. It is putting an added burden upon an already irritated and inflamed organ which needs rest. We would not think of prescribing exercise for a sprained or broken arm, and I do not believe it is good policy to prescribe exercise for a diseased lung, which requires as much rest as it can obtain. The most successful treatment for pulmonary consumption today is the complete rest treatment, coupled with an abundance of sunshine and fresh air and proper diet.

Dr. Stevenson, of Richmond: I agree with the doctor who has just preceded me in the operation which he has mentioned. I do not think we should attempt to take out the tonsils and the adenoids without an anaesthetic. Now I know of some men in Indianapolis that do not give one, and they clip out the tonsils hurriedly, and they get a great deal of it because they are excellent men, but Dr. Bulson and I could not do that. I think in children we should give an anaesthetic, and in this way you save a good deal of time. I think it is most important that we get all of these bodies out when we decide to operate on a child.

As I have said before on this floor today, mention was made at our last meeting in regard to a section for the eye, ear, nose and throat, and I believe that ought to be in effect today. If we had that section we would cover a broader field. I would like for a committee of three to be appointed, and if I could get a second I would like to name Drs. Bulson, Hood and Masters.

Chairman Garber: That would have to go before the house of delegates in the morning.

Dr. Spohn, of Elkhart: I would like to talk on the first paper. I enjoyed it very much. It was such a general subject it seems to me. I can not agree with some of the speakers on the subject of surgery. It seems to me that there is too much cutting done on the nose and throat entirely. I realize more and more the necessity of saving our turbinated bones. I see the mistakes that I made fifteen to eighteen years ago. These bones were put there for a special purpose, and I do not think that so much surgery should come in for a catarrhal disease. Not as I understand it anyway. I must say again that I think that surgery is overdone in the nose and throat. I believe that there are instances when it is absolutely necessary, but I think there is a disposition to do too much of it. Gentlemen, if you can reduce this condition with medicine, it makes no difference what it is, use it; do not operate unless you positively have to operate. I think we ought to be very conservative about this. In children it is true these parts are often affected, and yet every case should not be operated on. Some operate even for a trifling enlargement of the tonsil. Then they are taking away what was put there for a purpose, and unless it is diseased it should not be taken away. When there is

something wrong it should be treated for two or three weeks with some mild preparation, and let the child throw its head back so that it will get into the throat and overcome the inflammation, and I think that you will find that after you have treated a case like this for a short time you will get along without an operation. If you find something that can not be removed by a local application then it is time enough to operate. I do not think that any one can remove the tonsil as well in a reclining position as you can in an upright. You can not get the tissue away; it is impossible to do it. I have tried it many, many times, and I find that it is unsatisfactory and not practical.

Dr. G. A. Whiteledge, of Anderson: This paper was prepared to cover this point in a very, very general way. As you know from hearing it read, I did not attempt to take up a classification, but I still contend that out of the cases that come to you with catarrh are cases with a definite pathology, and I will say that three-fourths of them need surgery. I will say that by the use of an acid it is not always burned down to the tissues, and the sinus is diseased. I treated this in a very general way, but I will say that these cases can not be cured by sprays and such things. I am very glad that the paper brought forth the discussion it did, and I think that this will do more good than all I have said in the paper.

Dr. Spohn, of Elkhart: With reference to the cause of a cough some one has made the statement that the difference in the diagnosis of a cough depends on the treatment. Now I want to say in the beginning that there is such a thing as going to the extremes in this work. I have tried this and I have experimented with a great many patients in the last fifteen or eighteen years, and I believe that I can take almost any ordinary cough, and if the patient knows how to breathe I can stop it without medicine. I have tried this with children when they had the whooping cough when they were only three to five years old, and I have practiced this right in my own family, and I have so controlled the cough that they did not whoop. I will not say that they did not cough at all, for they did, and you can not stop that cough entirely, gentlemen; but if you will try this method I venture to say that you will have excellent results. I can stop all of the

nervous coughs. If there is something in the ear you cough to satisfy the cough center. It is better by far to satisfy it for the time being than to use an opiate to do it with when you can do so simply by your breathing. Most any of these coughs can be controlled by our breathing, but it must be done systematically. Now you take a case of tuberculosis. You can not stop that cough; no one would say that, but you can reduce it to a great extent, and every time they cough the lung is jerked. Now which is the worse, to shake the muscles up and down constantly or jerk them violently at times? I do not mean to exaggerate the inhalations, not until they are painful, but just to draw deep breaths, always through the nose, never through the mouth. As I stated in my paper, just as soon as the mucous membrane gets moistened the cough will stop.

HYPERTROPHIED PROSTATE—A RESUME OF ITS OPERATIVE TREATMENT.

FREDERICK R. CHARLTON, M. D., INDIANAPOLIS.

The operative treatment of the hypertrophied prostate may be said to have taken some definite form only during the present generation. Prior to that palliation was to all intents and purposes the only treatment. There had been a few isolated instances of deliberate surgical interference, but it was in no sense common practice. What must have been the unhappy fate of prostatics in those earlier centuries we must imagine. As middle life passes and old age advances some general enlargement of the prostate may be considered nearly universal, so frequently does it occur. Yet it is not to be regarded as physiological.

Statistics are most variable, and yet it is measurably true that 50 per cent. of men past fifty-five years of age present symptoms traceable to this affection, and that perhaps 10 per cent. of all men beyond sixty years of age suffer in marked degree. Such figures become a source of wonderment. What did the doctors of bygone generations do, and with still greater relevance what did the patients do? The answer to this is the same in all medical and surgical advances—the doctor did his best, as much as he was warranted in doing under the circumstances, and these patients, the prostatics particularly, suffered excruciatingly and died. Modern prostatic surgery shares with the other surgical advances, with sanitation in the largest sense, with general enlightenment and the spread of rationalism, in the lengthening out of human life as proven by our life insurance tables, average longevity being increased something like three years in the last fifty years.

The mere existence of such an organ as the prostate was not known until 1563, when its discovery was announced by Massa, a Venetian. The first operators came centuries later when John Hunter, Brodie, Billroth, Chopart and others at different times tunneled with stiff instruments through the enlarged mass and

so relieved retention. The mortality was almost total, so that they seldom or never repeated the experiment. In 1834 Guthrie in a paper entitled "Division of the Bar at the Neck of the Bladder," first introduced an effective procedure. This was merely an incision by an instrument corresponding to our urethrotome. Mercier in 1837 amplified and carried the work farther along, and it was one of his pupils, Bottini, who in 1877 practiced and urged the adoption of the galvano-cautery as a step in advance.

Kuchler (1866), Billroth (1867) and Demarquay (1873) had more nearly approached the modern operation by dilating and removing certain protuberant nodules, but it remained for Gouley, of New York, and Sir Reginald Harrison, of London, to almost simultaneously conceive and carry out enucleation by the perineal route. McGill, of Leeds, England, in 1887 first introduced to the surgical world suprapubic prostatectomy, and to him is due all the credit despite the recent unseemly controversy between Fuller and Freyer, both working fifteen years later and neither bringing any substantial contribution to the technique of McGill.

The many methods and modifications offer proof that the question is yet open for discussion, and that no one technic meets general approval. All are working towards the common goal of lower mortality and more perfect recoveries. It is hard to get at the truth of surgical results. Statistics are misleading—a series of cases operated on beyond seventy years of age really having little bearing on a corresponding series ten years younger. Likewise a series emanating from a careful man who studies his cases prior to operation and rules out the inoperable ones, viz., those with advanced nephritis or other almost absolute contra-indications to surgery, as against a series from an operator who fails in this respect either through recklessness or ignorance, and so runs up a high mortality.

Moreover, there are those who deliberately falsify tables of recoveries, and these padded statistics are criminally misleading. You must start from the premise that at best prostatectomy is an operation of gravity, that it often can not be quickly, easily and safely done, and that we do not get inevitably good results. There are complications and sequellae of most serious consequences, and they must not be brushed aside as trivial. If there is any sur-

gical procedure entitled to be classed as a major operation, that operation is prostatectomy. The results from our best operators seem to indicate an average mortality of about 8 per cent. This is really low when you consider that these cases coming to operation are in old men. They have fought their condition off as long as they could. Their general health has given way, and, broken in body and spirit, they turn to operation as a last hope. Interstitial and parenchymatous nephritis, pyelitis, arteriosclerosis and conditions of malnutrition all tend to a high rate of mortality. In contrast let it be remembered that many of our best results are little short of miraculous—that the vast majority are wonderfully relieved, and that more and more with improved technic has surgery been able to promise to these old men declining years of comfort and peace as against unendurable years of misery and incapacity.

The purpose of these remarks is to lead up to the ultimate question, when will you elect to operate? I say elect because some cases will be brought you in extremis, where every condition and outlook is bad, where, in short, the patient can not live as he is and chooses operation as the only thing left to do. Common humanity demands that you operate some of these to you almost hopeless cases. But by election—after palliative treatment has been faithfully tried and failed—then operate.

Palliation must not be tried too long, and by too long I mean this: If the urine becomes foul, cystitis developing, the patient losing sleep, the bladder wall becoming atonic; in short, if the patient does not entirely hold his own—the urine clear and the individual comfortable, then operate, and the sooner the better, before any further damage is done and while the recuperative powers are unimpaired. Watson, of Harvard, holds that more deaths are due to complications arising from the use of the catheter than from a corresponding number of cases operated on.

Prefacing a brief description of the different operative procedures let me urge that I would X-ray every case. The importance of this can not be overstated when it is understood that one-fourth of all prostatic cases present calculous formation, and that by reason of diverticula and distortion of the bladder floor ordinary methods of examination would often fail to reveal the presence of stone.

There are scores of methods, but most of them very similar and few of them possessing any unique or original features. Suprapubic prostatectomy—the operation of McGill; the bladder is opened, and after inspection an incision is made directly through the floor over the most prominent growth, the incision extending parallel to the urethral axis. More than one such incision may be made if necessary. Through this incision the offending mass is removed. This may be accomplished by being shelled out by the fingers, aided by forceps, scissors or tenacula. The facility of removal of prostatic tissue depends on its character, whether fibrous or adenomatous. If the latter, such an operation is easy, but if the former it amounts to a dissection by scissors and biting forceps. Counter pressure is made from below through the rectum or by the perineum with the purpose of lifting the base of the bladder into easier reach. Enormous prostates are so removed successfully. Post operative drainage is maintained through the supra-pubic opening. This is now the operation in favor among English surgeons, who report most enthusiastically on it. J. William White and Deaver in this country regard it as the operation of choice. Personally I would elect this operation only in cases of marked median enlargement or where a large calculus was present as a complication. I submit that in cases not of this character greater injury is likely to be done the bladder and prostatic urethra than in the perineal operation, and without any equivalent gain I can determine.

In a recent issue of the American Medical Journal Harry Fenwick, of England, while still advocating this method, practically concedes the substance of this criticism and then offers some suggestions as to more detailed technic. Two different methods are advocated with reference to the perineal route, the one contemplating removal by the urethra, the other by an incision in the capsule, the urethra being left intact.

The first, that of Gouley, was published in 1873. He makes a median incision on a grooved guide into the membranous urethra, extending it backward, splitting the apex of the prostate. The finger can usually be carried into the bladder and digital examination made. Then using the finger with suitable instrumental aid he removes the hypertrophied masses, which almost always project as nodular obstructions into the urethral canal.

The enucleation follows the course of the capsule and contemplates leaving as much urethral mucosa as possible. Particularly the roof can be left in most cases uninjured, and certain shreds along the sides and floor to serve as grafts from which the entire lining may be restored. Perineal drainage is maintained, the rubber tube serving as a splint about which the lacerated urethra will conform itself. While theoretically this operation is far from ideal, clinically it yields a high percentage of recoveries, certainly a somewhat lower mortality than the supra-pubic, with less annoying sequellae, and is more generally applicable and easier of accomplishment in many hands than any other.

Watson is an ardent supporter of this method. In answer to Young's criticism that it is a tearing out of the prostate in the dark he answers that he has watched Young operate by his own method, and that he has tried the Young method on his own account with the irrefutable finding that by reason of hemorrhage and depth of wound he was compelled to trust his tactile sense in the end, so that the criticism is equally applicable to one as the other. My own experience has been largely with this method, and perhaps for the reason of better acquaintance I find my first inclination leads me to choosing it. Yet I must admit that it in a measure violates my theoretical sense of what constitutes ideal surgery in that it does damage the prostatic mucosa.

Professor Riedel, of Jena, opens the prostatic capsule through a curvilinear incision in front of the arms. He then with a sharp spoon and biting forceps removes prostatic tissue bit by bit, never invading the urethra and yet taking away all protuberant masses that encroach upon it. In the same way the bladder floor is lowered by removing the upward extending hypertrophy. The ejaculatory ducts may be left undisturbed. He does not claim that this method applies best to all cases. He insists on the complete preservation of the urethral mucosa and the vesical sphincter, and this is accomplished by his method. If strictly a median enlargement he would do McGill's operation. This is one of the most scholarly and theoretically scientific contributions to the subject, the only question being its difficulty in the way of time required and tedious technique. Contrast this splendid paper with the repeatedly published assertions of Dr. Hugh Ferguson, of Chicago, to the effect that it did not make any difference

whether you sacrificed the prostatic urethra or not. Deaver, of Philadelphia, likewise comments that "whether the prostatic urethra is removed or not makes apparently no difference in the functional result." Nearly every man of note in the country has published reproductions of prostates removed en masse, the urethra included, and generally marked in the plates by having a catheter passed through it.

This all to prove that such total enucleation can be accomplished by one route or the other. Of course it can, but why should it be done deliberately? To urge it is to teach pathological nihilism. It violates every tenet of anatomical, pathological and surgical groundwork and promotes vicious surgery. The baldness of it is so potent, the certainty of a cicatricial new urethra with subsequent stricture and fistulous tracts so sure that these publications from good men make us to doubt our very household gods and wonder to whom we are to turn for guidance.

We must work toward the preservation of the prostatic mucous membrane. Young, of Baltimore, modifying the French operation of Proust, exposes the prostate through a V-shaped incision, this being the incision used by Celsus 2,000 years ago in "cutting on the gripe." This same incision was revived centuries afterwards under the name of Zuckerlandl. He makes two incisions on either side of the urethra one and one-half c. m. deep, leaving a bridge of tissue uninvaded that holds the verumontanum and the ejaculatory ducts. Enclieation is then accomplished by finger and forceps and the urethra not damaged. A gauze pack and perineal drain is established. That the urethra is not damaged may be occasionally true, but in most cases I believe it will be torn unavoidably. In a laboratory dissection prostatic tissue will often tear and the mucous membrane tear before the membrane will be separated from the glandular substance. Young's chief claim to consideration, however, lies in the preservation of the ejaculatory ducts and the sexual functions, all of which seems to me somewhat specious argument.

I submit that the whole question seems visionary as applying to anything like a complete operation; neither can I see why such a strenuous argument should be made. Few men come to operation until after sixty, and such have in the vast majority of instances long since lost all sexual power. Such men are glad

to live the remainder of their lives in comfort without any thought of a restoration of perpetual youth. Moreover, it is stated on good authority that the spermatic fluid has no fertilizing power when unmixed with that from the prostate. Other things being equal, we should save the ejaculatory ducts if possible, but it must be a secondary consideration as against mortality and restored bodily comfort. The use of the rectactor to bring the gland down within reach adds effectiveness to any technic. I believe that in cases best suited to the perineal method of approach that theoretically Young's operation embodies many almost ideal features, particularly in younger men, where any effort towards conserving sexual potency is commendable. However, it is somewhat less simple, requires more time in its performance, and consequently in the average case, to my mind, possesses no advantages over that of Gouley, with this against it, that it involves more extensive dissection with greater subsequent risk of cellulitis and sepsis.

Bottini in 1877 proposed resorting to the galvano-cautery as a means of relief, and devised an instrument for the purpose. The method has had periods of temporary popularity and longer periods of decadence. Freudenburg in 1897 improved the instrument and again called the attention of surgeons to its use, since which time it has made some headway. I can do no better than quote from some of its followers. Deaver says: "It stands midway between palliation and radical treatment, but that its results are uncertain and that it is properly applicable to a very limited number of cases. Its mortality in the hands of its experienced advocates is not less than perineal and inconsiderably less than supra-pubic." Hagner, of Washington, in the opening sentence of his monograph says: "I wish it to be distinctly understood that I believe that no operation will ever be as successful as a prostatectomy if the patient's physical condition is such as to warrant it." Young, after using it extensively, comments: "The safest and quickest means of curing the patient is perineal prostatectomy." J. William White says that he "regards it as still on trial and never mentions it to his patients." Watson pushes it into the background, giving as his reasons the fact of its developing 22 per cent. of complications, such as recto-urethral fistula, orchitis, incontinence, sepsis and sloughing, as against 6½

per cent., the average of complications following either suprapubic or perineal prostatectomy. Moreover, he urges that the results are not permanent. Riedel dreads the necrosis and secondary hemorrhage, stating that while 5 per cent. admittedly are lost by post operative hemorrhage, he believes it is far above this, and comments on the ardent surgical disposition not to publish unfortunate results.

Willy Mayer says: "If operation by the knife be refused or there be contraindication to such intervention then the Bottini operation is in order." Casper, of Berlin, explains that he will use the Bottini in a few selected cases, but even then with the realization that results are altogether uncertain. The instrument has been modified by many different men—the object, however, remaining the same—to, by galvano-cautery, incise the obstructing lobes about the vesical orifice, hoping for subsequent contraction and so attain to better drainage. A fair conclusion seems to be that it is a poor substitute for removal.

Its analogue is to be found in skin surgery where escharotic pastes are used to destroy or modify tissue where the same might be accomplished in a clean, quick, accurate and thorough way by the knife. I admit to a strong prejudice against it, and would only consider it if other methods were out of the question.

I have briefly outlined the operative methods. No one will apply to all, surgical judgment being requisite here as elsewhere. Pathology, palliation, diagnosis and details of dressing and care I must in this limited paper omit.

Prostatectomy is an operation of gravity not to be rushed into at first appearance of symptoms, yet a step that should be taken without too great and dangerous hesitation. It offers in suitable cases a new lease on life, it gives to the sufferer opportunity of spending the evening of his days undisturbed by distressing pain and disability, and is this not enough to warrant us in urging it?

DISCUSSION.

Dr. W. N. Wishard, of Indianapolis: I have very little to add to the interesting paper of Dr. Charlton. The operation has undergone many changes in the last twenty years, and particularly in the last ten years. In dealing with the prostate surgically very much depends upon the individual and the method

with which he is most familiar. One man may succeed by the suprapubic operation where another would do better or as well in a similar case by the perineal operation. In cases of very large gland accompanied by stone in the bladder, the stone and the prostate growth are usually more accessible through a suprapubic opening. Suprapubic opening has been clearly shown to be more dangerous than the perineal. Whether we use the suprapubic or perineal it should be distinctly understood and always kept in mind that the primary object of prostatectomy is to restore the original low level emptying point of the bladder as well as to remove all obstructing intravesical tissue, and in addition, any growth which infringes upon the caliber of the prostatic urethra. The object is, whether we remove the whole or a part of the prostate, to keep in mind the mechanical relation of the obstructive growth to the function of the bladder. In other words, some men will have a prostate of very large size, yet they will practically have no disturbance of the bladder and may be able to empty it completely and the urine may be normal. On the other hand, you may put your finger in the rectum and find no enlargement at all, and yet upon cutting into the bladder discover that you have a very large growth to deal with. And so it comes about that before opening the bladder no one can tell positively what is the condition likely to be found and the best procedure to follow. The perineal opening gives access to the vast majority of cases and is best adapted to a larger number of cases than the other, and personally I prefer to enucleate the prostate through a medium perineal incision, when it is possible to do so.

Operations of M'Gill and Fuller have been referred to, but they should not be confused with one another. The original suprapubic operation of M'Gill, which he did for two or three years before his death, and which he described, is a very different procedure from the more complete operation of Fuller. M'Gill's operation paved the way for Fuller's and similar operations, but contemplated only on removal of distinctly obstructing intravesical growths, and they are removed by the scissors, forceps or finger.

I want to say a word in reference to the cautery. I agree with the essayist that the cautery has not a wide field of usefulness,

and yet I have quite a string of cases where it has accomplished excellent results where under cocaine anesthesia and by the introduction of my perineal tube so that the growth is within the view of the end of my instrument, I have been able with the cautery to remove the obstruction and obtain perfect bladder function. I have been talking today with a physician attending this meeting whose father I operated upon by that method five or six years ago and he is in perfect health at this time. The cautery is useful if you can apply it where it should be applied, and this comment refers to the Bottini operation because that operation is done largely in the dark.

Dr. Barnett, of Fort Wayne: I watched an operation by Peufnick, who remarked when the prostate was removed that it was free from urethra. I examined it and showed him what I thought was the urethra and he admitted that it was the urethra. It makes no difference if the urethra is removed because the mucosa will cover over and reform and there will be as perfect a urethra as if you cut around it and make holes here and there and have trouble afterwards by doing something that is not necessary.

In regard to the vesicae seminales being cut or hurt, I think we can not operate in that region without doing injury to the ejaculatory duct. But if the ejaculatory duct is patent and the subject empties out his spermatozoa afterwards the prostatic fluid is not necessary because the female fluid acts as a culture medium.

Freudenberg of Berlin thinks enucleation through the urethra is the only method and he will do that without anesthesia while the patient smokes a cigarette. I believe the safest way of running the cautery knife through the prostate is by way of a perineal opening. Median section of the perineum does no harm, but does good, and through Dr. Wishard's instrument you can see what you are doing. But I believe a perineal prostatectomy is the operation of choice by most men, and if a prostatectomy can not be done then do a perineal section for drainage.

I want to ask Dr. Charlton about the X-ray work. I do not think much of that. We have got too many bones in there. The prostate is not sufficiently dense. I would like to hear his experience.

Dr. Edwin Walker: I think the last word has hardly been said about operations of the prostate. The choice of operation is largely individual and probably the best operation is the one the particular operator has had the most experience with. Most G. U. surgeons are more familiar with the perineal route. On the other hand, the abdominal surgeon will find it easier to do it by the suprapubic method. If any one will see Freudenberg in Berlin he will see that good work can be done by the Bottini method. A few years ago I spent some time with him and had an opportunity to observe the cases afterward, and while it will not be a popular operation in the hands of many people he has done quite good work. His mortality is small. It is not over three or four per cent. He has worked out the technique of that operation so that with him it is quite an accurate and easy procedure. He does it under local anesthesia and he claims for it that the patients are not in bed more than two or three days. I have seen him get them up in two days, and besides that, the sexual functions are retained, and that is an important desideratum with many of these patients. Some objections occurred to me after seeing the operations. After the burning there is usually a swelling at once that makes it quite difficult to introduce a catheter and I believe in some cases one would be compelled to puncture the bladder to relieve it. And I found that the patients do not recover as rapidly from the cystitis. Still I believe there are cases in which the operation ought to be done; but it should certainly be limited to the hands of a few surgeons.

In regard to the suprapubic operation, I have seen Frayer in St. Peters do the operation in five minutes, and he does not try to save the urethra. He simply splits the mucous membrane and enucleates the whole growth. The claim is made that strictures do not occur after sacrificing the prostatic urethra. I had one case in which stricture gave me some annoyance and I had to use dilatation and there was some stricture following. Two years ago Frayer had done 1.500 operations with a mortality of about 6 per cent. I believe the question after all depends upon the personal experience of the surgeon, and each method has its place in surgery.

Dr. F. R. Charlton: Answering Dr. Barnett's question as to the use of the X-ray, I had no notion of applying it as a meas-

ure to the prostate itself, but merely as a measure of diagnosis to determine whether there is a stone in the bladder or not. The ordinary method of searching for stone by the Thompson searcher is altogether inadequate. Where we have an enlarged prostate a large stone may lie entirely behind the prostate and not be touched at all by the ordinary searcher, while the X-ray will show the stone.

I think it must be conceded that we are going to have an advance along this line. It is a comparatively new subject. I do not know whether I am prejudiced because I am doing more work along this line than any other, but it makes me wonder why the average practitioner does not take a greater interest in it. And when we consider that fifty per cent. of the men in this room are going to deal with this question in after life, it calls for personal observation.

DIPHTHERIA.

BY J. A. LITTLE, A. M., M. D., LOGANSPORT, INDIANA.

There is scarcely a more valuable contribution to human life and happiness than that which has been given to mankind by the fathers of medicine. And in no place is this more noted than in the scientific discoveries in bacteriology. It is here that has been found not only the cause of many deaths and aches and ills, but also the means of withstanding, relieving and preventing them.

The discoveries in bacteriology open to us a new field and lift medicine out of the pit of empiricism into a plane of scientific truths and facts. Many diseases have opened up their heretofore secret, causative factor and now let the therapeutist meet the bacilli with their products in a free, open field. In no disease is this more true than in diphtheria, which has been a dreaded slayer for ages, but is now almost shorn of its powers and horrors. Since the advent of antitoxin the death rate from diphtheria has been reduced from 30 to 60 per cent. to 1.2 to 5 per cent.

It is true of our knowledge of diphtheria and its treatment, as of every important discovery in medicine, that it is not the sole product of the researches of any one man, but is due to the combined efforts of preceding and contemporaneous workers, each one forging a link of the chain, the last one combiniig all the preceding efforts into a grand, harmonious whole.

The diptheria is not a pure infection, but there are always associated with the Klebs-Loeffler bacilli streptococci and straphylococci in greater or less abundance, and the latter often give rise to a concurrent septic infection which constitutes an important factor in the course of the disease. It is sometimes difficult to determine to what extent this secondary infection is responsible for results as distinguished from the primary infection. Doubtless in many cases of diphtheria streptococcus infection is the principal cause of death.

If the septic infection is pronounced the cervical glands become inflamed and swollen and sometimes suppurate. The temperature usually runs high—102 to 104. The pulse rapid and feeble and the extremities are often cold, and death may result from extensive systemic poisoning. Sometimes the poisoning is more gradual and the diphtheritic symptoms apparently subside, but the patient instead of improving is apathetic, looses weight, becomes anaemic, grows weaker and weaker and gradually passes away. In milder infections we have the symptoms varying in accordance with the degree of infection, it often being difficult to distinguish as to how much is due to the Kleb-Loeffler bacillus and how much to the associated micro-organisms. Very commonly we have pneumonia of septic origin which very frequently results in death. The presence of epithelial and hyalin casts in the urine, together with large amounts of albumin, points to a rapidly developing systemic poisoning. Otitis media and gangrene of the jaw are not infrequent in septic cases. Diphtheria and scarlet fever are very often associated together as epidemics and when attacking the same patient necessitate a very guarded prognosis.

Dr. Biehm, director of the laboratory of the board of health, Chicago, calls especial attention to the fact that the severity of the disease is no measure of the virulence of the bacteria; a great deal depends upon the resistance of the patient. Neither does the severity of the disease bear any relation to the duration of the infection. On the other hand, it is quite generally recognized that true diphtheria bacilli may possess varying grades of virulence. Those occurring in the throats of convalescing patients and those found in the throats of healthy persons have frequently a very low grade of virulence. As the patient progresses toward recovery the Klebs-Loeffler bacilli usually become less and less virulent, but these virulent or attenuated forms may become very virulent when accompanied by proper nutritive conditions, or low resistance of patient. Hence in epidemics of tonsillitis and mild diphtheria an occasional very malignant case, Roux and Yersin showed that the different cultures of diphtheria germs varied greatly in virulence; this accounts for the fact that cases with a small amount of membrane formation often require more antitoxin than those with a great deal more membrane. The extent of the membrane formed is dependent upon the vege-

tative powers of the bacillus and the mixed infection, and bears no relation to its virulence. Sometimes the most virulent and toxic cases present almost no membrane at all, and these are most dangerous because their gravity is not recognized and their toxic products attack the cells and tissues of their host unopposed—death resulting often suddenly before the family or physician realize the severity of the disease.

In cases of diphtheria the bacilli themselves remain for the most part confined to the false membrane in the naso-pharynx; no general infection of the blood takes place as a rule, though in severe cases a diptherial septicaemia often occurs. As the disease progresses the bacilli multiply and the membrane spreads superficially by continuity and may extend to the larynx and bronchi, the nose, the eyes, the mouth and rarely to the stomach. Indeed, the diphtheria bacilli are frequently found in the liver, spleen, kidneys, lymphy nodes, heart's blood, brain, middle ear, anthrum and accessory nasal sinuses. Whether the diphtheria bacilli does or does not continue to produce the toxic products wherever they may be in the blood or internal organs it is impossible to say, but from the number of fatal cases with such an infection it would seem very probable that it does, and we can see no reason why it should not.

The bodies of the bacilli themselves are not so poisonous as their soluble products. Thus Kossel showed that if the actual bacteria were washed free from the poisons and then killed the dead bodies had very little toxic influence when injected into animals. Not so with the toxin, for it is a very poisonous substance, which has been separated into three principal compounds, namely, toxine, toxoid and toxone. The toxone is the active poisonous constituent. It causes the fever, prostration, cloud swelling and later fatty degeneration of heart, muscle, kidney cells, etc. When death occurs acutely it is the toxine which is responsible. Toxone attacks the nerve cells and is generally slower in its action than toxine. Toxoid is not poisonous in itself but is capable of neutralizing antitoxin. Indeed, it has more avidity for the antitoxin than has the toxine itself.

Now, as the bacteria pour out a constant steam of toxin and this is constantly entering into combination with the side chains of the cells it is most important to introduce the antidote as soon

as possible before any great amount of mischief is done. The great principle, therefore, in giving antitoxin of any kind is to give it at the beginning of the disease, at the earliest possible moment; and especially in diphtheria it has been conclusively shown that the powers of the remedy over the disease vary directly with the promptitude of its administration. After the toxin has produced destruction of nerve and muscle cells, the antitoxin will not restore the broken-down tissue and can only arrest it in so far as additional toxin is concerned, but fatty degeneration and necrosis may have reached such an extent as to baffle the rebuilding powers of our patient, and therefore continue until death soon results.

A second principle is to administer a large initial dose, since we do not in any case know the amount of toxine which has to be counteracted, and the supply of the latter is constantly increasing, whereas the remedy is given all at once in a single dose and is not in any case repeated for some hours afterwards.

There is also the possibility that the presence of a large quantity of the antitoxin may tend to withdraw from the cells any toxin which has not already firmly united with them. Also we ought not to hesitate to repeat the dose if it seems in the least necessary. It is better to err on the side of giving too much than too little. It is quite certain that in the early days of antitoxin much too small doses were given, and even now thousands of lives could be saved annually by more prompt and, in severe cases, heroic administration of antitoxin. For it has been proven thousands of times that if enough good antitoxin is given when it is in its incipiency, diphtheria will surely be cured by it, but each day of delay multiplies the dangers to the life of the patient from toxic and septic poisoning. And when the disease has progressed to gangrene, fatty degeneration and necrosis, and sloughing from mixed infection, don't condemn antitoxin if the patient dies, but rather regret that it was not given earlier in the disease.

There is one specific in diphtheria, namely, its antitoxin of standard quality given in sufficient dosage. All the much-vaunted remedies have seen their day and are rapidly passing into disuse or becoming adjuncts to antitoxin. The inhaling of irritating gases—chlorine, lime, etc., have been found to increase

the bronchitis, pneumonia and nephritis. Tr. chloride of iron, while no doubt it has beneficial effects, certainly has the undesirable effect of upsetting the stomach of many children, and this is not a qualification to recommend it in a disease in which keeping up cells and tissues with proper nourishment is of so much importance. Calomel fumigations are often followed by mercurial poisoning, stomatitis, diarrhoea and marked anemia. Complicating diseases caused by simultaneous action of other organisms in conjunction with the diphtheria bacilli will obviously be only indirectly influenced by antitoxin. It must not be forgotten that the serum is a specific against one disease—true diphtheria; the combating of other organisms and their products and the sustaining of the patient needs additional treatment.

In speaking of the paralysis which sometimes accompanies or follows diphtheria it is only fair to assume that in severe cases with a great deal of toxaemia, paralysis will occur with or without antitoxin if the patient lives long enough, but if the treatment is begun early enough and large enough dosage, paralysis will probably be prevented. It usually results from one of two causes—the tardy administration of antitoxin or the employment of antitoxin in insufficient doses to destroy all the toxins in the system. And, again, paralysis was noted many thousands of times before the days of antitoxin. Besides, the vast majority who now recover with a temporary paralysis following the use of antitoxin would have died without this assistance. The dropsy following the use of antitoxin is due to the fatty degeneration and other disturbances of the heart and kidneys due to delay in the administration of, or insufficient dosage of, this remedy.

Urticaria and arthralgia sometimes develop, but in most cases are of little consequence and soon disappear. Occasionally very severe rashes and joint pains are met, but of the millions of patients who have received antitoxin not a single death can be fairly attributed to it. The antitoxin principle itself has nothing to do with this eruption and other manifestations. It has been quite conclusively proven that plain horse serum when injected into individuals will produce the above results in about the same proportion of cases as the diphtheria antitoxin serum. This is no cause for rejecting antitoxin but only calls for more perfect method of separating and conveying it. It is also to be noticed

that some of these skin rashes are of a scarlatinal and eczematous nature, and were noted long before the discovery of antitoxin. But when we consider the tendency to eczema of some people and remember that diphtheria and scarlatina are often associated together—mixed infection—we have solved many of these rashes.

Case 1. Carl S., 16 years of age, had been ill five days with supposed tonsilitis and quinsy. He frequently suffered with tonsilitis. When seen there was marked prostration and dyspnea, the voice quite husky, the act of deglutition very difficult and painful, the cervical glands were much enlarged, the pulse was feeble and irregular; there was a profuse nasal discharge and some delirium; there was a very extensive diphtheritic membrane covering both tonsils, palate and adjacent tissue and anterior and posterior nares of both sides. The clinical picture he presented was that of a patient moribund from an attack of diphtheria. The case seemed hopeless, but believing that no patient ill with diphtheria should be considered beyond help, 5,000 units of antitoxin were given and a portion of the membrane from the anterior nares removed. This was at midnight. At 9 a. m. the following morning the diphtheria membrane had covered the denuded nasal surface and was thicker than before. No improvement being noted, 10,000 units were given and nasal membrane again slightly denuded. At 2 p. m. nasal membrane reformed, respiration slightly easier, slight relaxation of nervous tension, and 6,000 units given and nasal membrane again denuded. At 10 p. m. nasal membrane reformed, nervous tension and dyspnea more pronounced, 11,000 units given. At 9 a. m. the following day nasal membrane reformed, nervous tension and dyspnea slightly lessened, 14,000 units given in a period of two hours' time. He now began perspiring freely and passing much more urine, the respiration pronouncedly easier and a relaxation of nervous and muscular system. The membrane began fading rapidly from the naso-pharyngeal surface and the heart's action stronger and more regular. At 8 p. m. he was slightly restless and gave 8,000 units more, after which large quantities of membrane loosened and the entire membrane rapidly disappeared. Kidneys and bowels were kept wide open and stimulants, etc., used. There was no complication and no injurious effects. The boy made a speedy recovery and was discharged in three weeks,

and has enjoyed the best of health ever since, which is now two and one-half years. In all, 54,000 units were given in forty-four hours. It is possible that the boy might have recovered with a slightly diminished dose; it is certain that the usual dose of antitoxin would not have saved his life and it is also certain that no injurious effect followed the dose given.

Upon inquiry of this boy, who is of more than usual intelligence, as to what if any effect he felt when given a dose of antitoxin, he stated that he was very restless and irritable and that the antitoxin was like a hypodermic of morphine; after receiving a dose he felt much easier for four or five hours and could sleep a little. He would then again get restless until given another dose or the disease under control; the larger dose giving greater and longer ease.

Case 2. Anna S., six and one-half years, had been ill four days with supposed croup. When seen, dyspnea was very great and there was marked syanosis, pulse feeble and rapid; unable to phonate. Intubation or tracheotomy seemed imminent; 5,000 units of antitoxin given. This was at 2 a. m. At 5 a. m. respiration and circulation greatly improved. At 9 a. m. cynosis increasing, respiration more labored, patient flouncing recklessly about the bed and presenting the heartrending scene of a little patient dying of membranous croup. At 12 noon she was unconscious and unable to turn herself on the bed. Consultants had discouraged further efforts, but with the consent of the parents 10,000 units were given. In one hour respiration easier and cyanosis decreasing, and in two and one-half hours cyanosis markedly decreased and respiration fairly easy. Small amounts of membrane were expectorated. At 8 p. m., on account of increasing restlessness and labored breathing, 5,000 units were given, and in one hour afterwards large pieces of membrane were coughed up. At noon the following day 3,000 units were given and the girl made a good recovery; 23,000 units were given in thirty hours.

There was a slight paralysis of the vocal cords and right arm, lasting about nine weeks. This girl is now one of the very brightest pupils of the city schools. The conclusion that the girl would have died if antitoxin had not been given in large and frequent doses is certainly justifiable.

Case 3. Otto S., four and one-half years, had been ill four days with supposed croup. When seen the breathing was so labored as to be heard throughout the entire house; marked cyanosis and complete aphonia. It looked as though operative interference was imminent. Five thousand units of antitoxin given at once—midnight. At 7 a. m. he was greatly improved. At noon gave 2,000 units, hoping this would be sufficient, but it was too small a dose. At 10 p. m. he was much worse, and family thought him dying; gave 9,000 units and two hours afterwards he coughed up large pieces of membranes. At noon the following day gave 3,000 units and boy made good recovery, without complications, except four days after last dose of antitoxin was given he developed pneumonia, which lasted three weeks. He was dismissed at the end of thirty-nine days. In all this patient received 19,000 units of antitoxin in thirty hours.

Case 4. Frank G., aged three and one-half years. About a month previous to this sickness he was accidentaly poisoned with paris green and ten days previous had had cholera infantum. He had been ill four days when seen. There was an extensive, dirty, necrotic, diphtheritic membrane upon the tonsils, uvula and adjacent tissues and the posterior and anterior nares; heart feeble; marked dyspnea and cyanosis; profuse nasal discharge and very offensive breath; cervical glands much enlarged. Gave 3,000 units of antitoxin at 12:30 a. m. and three doses of 5,000 units each at intervals of seven hours, with but slight effect; the second day 31,000 units were given in four doses, with very noticeable improvement; the third day 35,000 units were given in four doses, with very marked improvement, and boy breathing through the right nostril Before noon of the fourth day 22,000 units were given in two doses, with continued improvement and boy breathing through both nostrils; the amount of diptheritic membranes were very greatly decreased. He was able to drink milk with slight difficulty. We were unable to get more antitoxin for twenty-four hours, the last fourteen hours of which time patient rapidly became worse. Both nostrils closing and membrane very greatly increased on the throat and also present on cheek and lower lip; there was marked diminution of the urine; temperature 104. Fifth day, in the afternoon, gave 14,000 units, all that was obtainable, with but slight effect. Sixth day, gave 38,000

units, with increased activity of kidneys and disappearance of membrane from lip and cheek. Seventh day, 31,000 units, with slight improvement; eighth day, 40,000, with opening of both nostrils, relaxation of muscles of the face and increased activity of kidneys. Ninth day, gave 37,000 units, with reduction of temperature and marked increased interest in things about the room and wanting to take milk from the cup. Tenth day, 34,000 units given, with almost complete disappearance of diphtheritic membrane and greatly improved in general appearance. Eleventh day, gave 6,000 units; pulse still soft and with slight increasing irregularity, but the general appearance and condition of the patient very greatly improved. Strict orders had been given in regard to nursing and diet. The following two days he improved more rapidly than could have been expected. Fifty-one hours after the last dose of antitoxin was given he was indulged to a drink of milk from a cup, his head being raised from the pillow, when he strangled, struggled a few moments and was dead. We have every reason to thoroughly believe that with less indulgent nursing our boy would be still living, and this a triumph for modern medicine, even with the delay in the beginning of the disease and the inability to get sufficient antitoxin at an important time. However, we can not compute the amount of fatty degeneration and nerve destruction in such a grave and prolonged case as this. But we did observe that there was no urticaria or arthralgia, that the action of the kidneys was increased and that the pulse became fuller and more regular when antitoxin was used freely. At no time was the heart depressed following a dose of antitoxin. Heart stimulants were used and bowels and kidneys kept well open, and patient encouraged to take as much fluid as possible to assist the elimination of toxins.

It is not the purpose in citing these cases to advocate the indiscriminate giving of large doses of antitoxin, but to prove that small doses are of little avail in treating of grave and advanced types of this disease; that in order to save the lives of these patients the serum must be heroically administered—that enough antitoxin must be given to counteract or neutralize the effect of the toxis substances within the body.

In severe and apparently hopeless cases McCollum of South Boston Hospital gives an initial dose of 8,000 units, repeating the

dose in four to eight hours of from four to ten thousand units, as he deems necessary. Cairns of Glasgow, Scotland, puts the dose for subcutaneous injections at from four to twenty thousand units; while intravenously he administers from twenty to thirty-five thousand units in these cases. He holds that in severe and late cases an initial dose of 20,000 units is not excessive.

It is my experience that in ordinary cases, seen the first, second or even the third day of the disease, small doses, three to five thousand units, and repeated in six to twelve hours, if necessary, are effectual. But in severe and delayed cases such doses produce practically no effect and larger and frequent doses must be given. The maximum effect of a dose of antitoxin is obtained in from three to six hours, and if enough has not been given the patient will begin growing worse. It is now time to give another dose.

The largest amount of antitoxin given to one patient that has come to my notice is that reported by Dr. R. A. Gray of Shreveport, La., in the Medical Record of January, 1905, in which the amount of diphtheria antitoxin given to his patient, a woman twenty-six years of age, from August 2 to October 17, 1904, was the enormous amount of 498,000 units, besides 150 c. c. of anti-streptococcus serum. The largest amount administered in any given period of time was on the 7th, 8th and 9th of October, when she took 32,000 units a day. She made a good recovery.

DISCUSSION.

Dr. A. L. Wilson: I am always personally interested in this subject. I have noticed, and I do not know whether it is only true of Indianapolis or not, but it seems to me that in my own neighborhood, or in my practice, in going about the city, we have but little diphtheria. At least, in frequent years we have not had so much. Possibly this is due to the use of antitoxin. At any rate, in Indianapolis we are not having so much diptheria as we used to have years ago. I will not discuss the pathology of this disease but will speak of the treatment. I have never found occasion to use as large doses of antitoxin as Dr. Little has used, but I do not know how soon I may find it necessary to do so, for I believe in using as much as we need. I have never had occasion to use more than three thousand units, and I

never have used more than two or three such doses. I think that the most important thing in diphtheria is an early diagnosis. If we would get the case early and use antitoxin early I think this amount would be sufficient. I also think, gentlemen, that we should not neglect other methods of treatment, such as spraying, and some of the constitutional treatments I certainly think are important.

I believe that the doctor said that chloride of iron would upset the stomach. I believe we use it in other forms. I believe in the use of iron, and if necessary alcohol, and one of the most important things is to keep the patient absolutely in bed. I have always believed that several years ago I lost a patient who was practically well on account of the parent allowing the child to get up. I was on my way to make my morning call, and I was just a little earlier than common that morning, and just as I came to the door I met one of the members of the family coming out, and he told me that he was just starting after me, for they thought the child upstairs was dying. I hurried up the stairs and found the child breathing quite naturally, and this continued for some time, but the child died from heart failure. I think we ought to be very careful to caution the parents about this point.

The essayist said that in some cases he believed we had a mixed infection of scarlet fever and diphtheria. In my judgment we do not have in the system at the same time both diseases—that we do not have both germs active at the same time.

Dr. Dye: I think it is hard for a man to judge when he first sees a case of diphtheria just how much antitoxin he should give, just the amount the patient should have, but the patient should surely have a pretty large dose the first time. Seven years ago I gave a little girl, six years old, forty-four thousand units in the period of four hours. I had a doctor in consultation with me who was a firm anti man, but he did not want to use the antitoxin, for he thought she was too near gone, and the family supposed that the child was about dead and were of the same opinion as the doctor. However, we got all the antitoxin there was in three little villages around where I was practicing at that time, and if I could have got more I would have given that. The girl recovered quickly.

Just recently I had the saddest experience I have had for a long while. I was called on Sunday at noon to see a little girl, four years old. One tonsil was removed, and the other tonsil was what you would term a typical follicular tonsil. I gave my usual treatment of tincture of iron, etc., and told the father to let me know how the little girl was. The father called me in the evening and he said she was better. Monday morning she was not doing very well and the father said that he would like for me to see her, and so I went over, and I thought that it looked exactly the same as it did on the day previous. I was called back late that evening and she had developed a croupy condition, and I asked if she was subject to croup, and they said she had had it, and so I gave her some croup medicine. On Tuesday morning the father called me over to see the child and when I went to the house my suspicions were beginning to get pretty strong that the little girl was not getting better of the follicular tonsilitis. I made an examination for the bacillus, and I found it. I want to mention in this connection that the germs found in this throat were the variety with small polar bodies. I gave her antitoxin as quickly as I could, and in the evening she was breathing as nicely as any child you ever saw. The next morning I was called again, and before I got there she died of cardiac failure. There was another child in the family. I explained to the family that this was not a typical case in the throat, but on the second day after the funeral the mother developed the disease and so did the other little girl, with a temperature of 105.4. I gave them eight thousand units with complete recovery.

In the last few years I have used nothing but antitoxin. I do not believe that it is necessary to bother the patient with iron. When you have to give antitoxin, give big doses.

Dr. T. Victor Keene, of Indianapolis: I admire the courage of Dr. Little in using such large doses. It is not a popular thing to do, as antitoxin is expensive, but when we consider the reason we are using antitoxin it really requires more courage to rely on small doses than to administer it in large doses. Every symptom, from the earliest pharyngitis to the remote paralytic complications, is caused by the toxin or poison elaborated by the diphtheria bacillus during its residence in the throat. This toxin by

its local action causes a coagulation necrosis of the tissues of the throat, producing the so-called membrane; it produces an actual fatty degeneration of the heart, in some cases quite marked; in fact, heart failure is a not infrequent cause of death. The therapeutic indication most certainly is to follow the old principle of remove the cause, and if we could do so the ideal plan would be to remove the bacteria producing the poison that is producing the disease.

Practically, we know that we can not do this, but we can neutralize the poison or toxin produced by this bacteria by the administration of antitoxin. Diphtheria antitoxin destroys diphtheria toxin as effectively as water does fire. The amount we administer should be sufficient to neutralize all the toxin present. We can determine only in a very general way, as often the immediate symptoms at hand will not give very accurate information on this point. A very small lesion in the throat may be producing a very powerful toxin, while likewise a large throat lesion may be producing but a small amount of toxin of low power.

The question of whether or not diphtheria antitoxin should be administered is no longer a matter of debate; the only question is when to administer it, and in what dosage. As to when to administer it: All will agree that it should be given as soon as the diagnosis is probably diphtheria. No one would, when a house was afire, wait till the blaze had assumed rather formidable size before sending in an alarm and making vigorous efforts to extinguish it, for one's common sense, founded on generations of experience, has taught him that a small blaze can, if handled at its beginning, be controlled more easily and economically than the same fire if we delay. And right here let me add parenthetically a few words as to early diagnosis. It is as profitable to wait until we have nothing left but the charred walls of the building and then gravely decide that a fire has occurred as it is to wait till the patient has a rapid, irregular heart, kidneys congested and irreparable damage done before deciding that diphtheria is present. The early diagnosis is possible and should be made in all cases.

Now as to dosage: The amount to be used will depend upon the stage of the disease, but this is but another way of saying

that the amount required will depend upon the amount of toxin to be neutralized, for the amount of toxin present is roughly dependent on the length of time the diphtheria bacilli have been manufacturing the same. I consider 8,000 units as a fair initial dose for an average case seen within the first two days of the disease. This should be followed within a few hours by a second administration of a like amount if there is not a very marked improvement by that time. Antitoxin is prompt in action, and if the case is not very materially relieved in a few hours we have not used sufficient antitoxin. It can be used in any quantity; in fact, there is no known lethal dosage, and there are many cases on record where 100,000 units and over have been used with good results.

However, I am fearful of the administration of oft-repeated injections of any animal serum, and regard it as a measure distinctly hazardous.

Not a great deal is known about the physiology of the serum globulins and albumins, but it is known that they split up into a poisonous as well as non-poisonous body. Experimentally, it is determined that the poisonous portion is much more active when previous injections have been made—that the animal is thus apparently sensitized to the poisonous principle—so that I regard the repeated administration of antitoxin, or any of the animal extractives or so-called serums, as a measure not without a very distinct hazard, and it is likely that they are much more harmful than is commonly supposed. I do not want to be misunderstood in this matter, for I urge the administration of antitoxin in large doses in all cases of diphtheria. In fact, I consider 15,000 units the least amount you would ordinarily be justified in relying upon. It may, however, be used in any quantity; but those cases exhibiting such a profound intoxication as to demand doses of 50,000 units or over, such as Dr. Little reports, will be certainly subjected to less danger from the actual injection if the antitoxin is injected in relatively few periods. The administration of 20,000 units at one time is a measure practically without risk, while the administration of that amount in small amounts in half a dozen different periods of injections is distinctly hazardous.

Antitoxin neutralizes the diphtheria toxin, but antitoxin will not have any effect upon the destruction wrought by the toxin

that has been in the body unneutralized by antitoxin before we made our injection. It can no more reconstruct injured tissue than the water thrown on a burning building can reconstruct the charred walls.

For this reason rest is of very great importance, and should be insisted upon in all cases.

Dr. Moore: I wish to congratulate Dr. Little on his success, and would like to say that I had a large number of cases develop one winter, and the largest amount of antitoxin I used was forty-eight thousand units within four days on a child three years old. In most of the cases no other medicine was used at all. Some give strychnine and whisky. I think the only thing is to use a sufficient quantity at the proper time. I think a doctor ought to be charged with malpractice when he does not do this.

Dr. Drayer: There is a time to give antitoxin, a right and a wrong time, as the doctors will remember. And it makes a whole lot of difference as to how much you use on the fourth day and how much you would use on the first day, or the tenth day, or the fifth day. It makes a difference whether or not you see the patient just as soon as the disease has developed. I think that the initial dose in the case that has developed when you see it the first or the second day, a case of moderate severity, should be five thousand units. In eight hours repeat with a double dose, or ten thousand units, and if not improved in eight hours more give twenty thousand units. Now this puts this proposition on a definite, exact basis. The idea of going into a case and injecting from twenty to forty-four thousand units does not appeal to my reason. That the doctor was brave and courageous and did the right thing no one would be more ready to admit than I. I do not think anything short of that would have had the result he obtained, but I do insist that we should try to establish some schedule and use some judgment in the matter.

Dr. Geo. T. McCoy: I think it is very important that you make an early diagnosis, and in cases where no membrane is present at all in a short time there may develop some most striking changes. There have been cases where the membrane appears the second day, and I think that the culture method should be resorted to early. If you do not have Klebs-Loeffler bacilli it will

be all right. This is not a true remedy unless you have the Klebs-Loeffler bacillus. An early administration should follow an early diagnosis. The great Trudeau said that the beneficial effect of tuberculin on consumption was in the least dose. Now, if we carry this out we should have some method of knowing what the effect of the least dose is. When you say that you repeat and double the dose every eight hours or every twelve hours it is not rational. You should have some physiological index or rule. In many cases no other remedy is needed than those which have been mentioned here, but in others there are complications of the heart, and these you should watch very carefully. I have used this remedy something over three hundred times in my private practice since 1894 and I have had few regrets. You need not be afraid of the rash that antitoxin will produce. Strawberries will also produce a rash. You can easily give a remedy for that.

Dr. C. H. McCully: I want to take exception to the idea that antitoxin is or acts as a neutralizer. I am not in harmony with that idea at all. I have not had a large experience with heavy doses, but I am very glad that such men as Dr. Little, men with courage, reach out in these unknown regions and pave the way for some of us who are more careful. I am glad that it has been demonstrated that we can give this remedy with impunity, and I believe that certain cases indicate certain doses.

As to the matter of doubling the doses, my experience has taught me that my very best results are anywhere from two to twelve or sometimes thirteen hours after injection, and sometimes four or five or six hours, but I wait ten or twelve or thirteen hours before repeating the dose. I am glad, however, that we can give a large amount of this without danger to the patient.

Dr. Little: I have been very glad to hear the discussion of this paper. In closing the discussion of this paper I want to say that the forty-four thousand units was not given in one dose. At no time did I give over fourteen thousand units, and I will say that my rule has been to give from three to five thousand units in the first place, and if I find that the case demands more I give more. Of course, it is owing to the severity of the case as

to how many units I give. I try to give enough so that the membrane will be loosened and then the patient will be all right in a little while. It may require more in some children than in others, but I believe that now we understand enough about this not to be timid about it. In these cases I try to keep them under my control and I stay with them at least half of the time, and am never away from them more than three or four hours at a time. Antitoxin is especially serviceable in the larynx. We also want to be careful of membranous croup. After this is given you can just stand by them and see the benefit from it. You must suit your doses according to the needs of that individual case. It would be much better if we were able to see the disease on the first or the second day, but we can not always do that. I want to say that in any case we should get rid of the poison as quickly as possible.

TYPHOID FEVER.

BY H. T. MONTGOMERY, M. D., OF SOUTH BEND.

Typhoid fever has been studied, discussed and written upon for years. It is one of the most constant, staple and familiar diseases, having been common to the human family for ages, and without doubt, long before it was singled out, recognized and described as a peculiar disease, possessing its own individuality. Yet until it was determined that most, if not all, constitutional diseases are due to toxins elaborated by microscopic organisms, vegetable or animal, little was really known concerning typhoid fever.

Medical scientists have fully established the fact that this disease is the result of the presence of an organic poison, elaborated by a vegetable parasite, known as the typhoid bacillus. This organism enters the alimentary canal by way of the mouth, mixed with food or drink, and not by inhalation or cutaneous absorption. When it has entered the system it has a peculiar predilection for lymphatic tissue, and immediately enters the structures of the solitary and agminate glands, they being by far the most numerous in the lower part of the small intestine; this fixes the central lesion of this disease in that locality. When once located in the lymphoid tissues of these organs, and no conditions present to prevent their accumulation, they propagate by the millions, elaborating by secretion, and affording by their death large amounts of toxins, which are rapidly thrown into the circulation, causing profound intoxication. This is the first danger point. And if sufficient poisonous material has been produced, and entered the circulation largely at one time, it paralyzes the life centers, and the disease reaches no further stage. This seldom occurs and the patient's life is secure for another week or ten days.

At this stage, during the period of extreme toxemia, in typical and medium cases, we have the highest temperature and most rapid pulse, with active delirium and a white, furred tongue. The

toxins in the blood are being taken care of by the white blood corpuscles and alexins, and possibly by chemical action, which we do not yet understand.

During the glandular inflammation the bacteria have accumulated with great rapidity, and produced quantities of toxins, which, having thoroughly saturated the local tissues, this highly death-dealing product, with the bacteriolytic properties of the blood, has probably caused the death of most of the living bacteria, a few having escaped into the lumen of the bowel and pass with the feces; others into the general circulation, finding their way to various organs and to the skin, where they are sparsely found in the eruption.

Typhoid bacteria are seldom found in the blood; cultures can not satisfactorily be grown from this fluid. Gibson, page 122, says: "The bacillus itself has certainly been found in all parts of the body, but curiously enough it is rarely found in the blood." Strumpel, page 2, states that "the germ may be found in the blood taken from the spot of roseola, but as a rule they are not found in the rest of the blood." McFarland, in his late work on pathogenic bacteria, page 500, states: "Ordinarily, few bacteria can be found in the circulating blood, but blood from the roseola contains them." This is probably due to the contained typhoid toxins, which seem to be, when present in sufficient quantity, destructive to the parent organism. This is not difficult to accept, when we recognize the fact that the same poison, showing this deadly and highly destructive property, is capable of rapidly pulling down and destroying the complex physical fabric of man. It is probable and not impossible that it would also be capable of attacking and destroying a simple unicellular protoplasmic organism. This proposition is supported by Allen in his Practitioners' Manual, page 353, where, in speaking of Widal's test, he says: "The test is based upon the theory that the blood of typhoid fever subjects contains some substance incompatible with the life of the bacillus typhosus when brought in contact with it."

It is a well-known fact that bacteria are autotoxic, and produce a lysin capable of destroying the cells or tissues of the parent organism. These substances are known as autolysins. Many acute bacterial diseases are self-limiting, and it may be, and probably is a fact, that in this way they become self-destroying. Those

that secrete or elaborate within their own organisms highly toxic properties may succumb to its high potency, thus rendering the system free from the cause-producing agency, and self-limiting.

The usual processes of inflammation are present in the solitary glands and Peyer's patches. This inflammatory process is by no means passive, but very active. Blood cells, serum and coagulable lymph have escaped into the tissues to such an extent that circulation has become strangulated and the glands necrotic, or, in other words, the glandular inflammation has terminated in coagulable or bacterial necrosis. But if at this time the inflammation had subsided, short of necrosis, leaving only an inflammatory infiltration of the intestinal glands, the patient would now be convalescent. The action of the typhoid bacillus and the marked effects of its toxins here terminate. You have no longer typhoid fever to contend with, but a gangrenous necrosis of the bowel and its results, the severity or gravity of the situation depending upon the amount and depth of the necrosis and the wide possibility of infection of the diseased bowel surface by other pathogenic germs

At the close of the second week or the beginning of the third the solitary glands and Peyer's patches are a mass of liquefying, gangrenous tissue surrounded by a system of the most vigorous absorbents in the body, which are emptying into the blood current secondary bacteria, toxins, poisonous fluids and saprophytic ptomains.

This is the second, most common and last danger point except death by accidents, such as intestinal hemorrhage, perforation and complicating organic lesions. If the conditions of the intestinal tract are such that the contents, both semi-solids and fluids, as well as the intestinal mucosa, are comparatively sterile to putrefactive germs then the necrotic tissue rapidly dissolves, loosens and sloughs, leaving a clean, healthy ulcer. Convalescence from intestinal necrosia is now established. The ulcers at this time do not vary from any simple ulcer of the intestinal mucosa. But if the necrotic tissues become the focal seat of putrefactive and other pathogenic germs with the admission of ptomains and toxins into the general circulation, the condition of the patient becomes profound and alarming. This is the condition wherein we have profuse perspiration, a dry, dark, cracked

and coated tongue, with usually marked tympanites and diarrhea. The tympanites is largely due to the putrefactive or gas-producing bacteria. The active delirium of the first stage has given way to a low, muttering delirium or a semi-comatose condition, and the excretory functions become involuntary. At this time the spleen becomes enlarged and pulpy, as in all putrescent conditions of the system. Our patient is now suffering from sepsis or sapremia, and must be treated upon that basis.

If the antitoxic properties of the blood and powers of the system are sufficiently potent and vigorous, with the help that medical skill may offer the patient recovers; otherwise death supervenes.

The question as to whether typhoid fever is an immunizing disease has not been definitely decided. Most writers and teachers today are inclined to consider it immunizing. Many people in all communities will tell you that they have had typhoid fever two or more times. Frequently physicians have attended the same person through two attacks of typhoid fever separated by an interval of several years. It is by no means rare to attend a patient through two attacks separated by an interval of from one week to ten days, known as a relapse. In one instance the writer attended the same patient through three attacks, separated by an interim of a week or more, during which time the party seemed to have returned to a perfectly normal condition except that of weight, each attack lasting six weeks. To my mind typhoid fever is not immunizing during the first two or three weeks following an attack, nor, in fact, for any length of time. No disease that we know to be strictly immunizing gives such a history. We have no relapses in measles, scarlet fever, chickenpox or smallpox.

It is unnecessary to further follow the course of typhoid fever. We have not aimed in this paper to point out and rehearse all the symptoms, history and complications, nor the various modes and dangers of accidental death, but have tried to confine ourselves, with as few words as possible, to the basic conditions found in typhoid fever.

In recapitulation we find that the specific germ enters the alimentary canal; if conditions are favorable it enters the glandular structures of the bowel, propagates in large numbers, elabo-

rates quantities of toxin, which produce general intoxication, usually not fatal, and at the same time the germs and toxins as irritants have produced a high grade of glandular inflammation, ending in bacterial necrosis. At this stage typhoid fever as a specific disease ends, and the patient would be convalescent if the inflammation, as it often does, had stopped short of necrosis, but with necrosis and secondary infection we have engrafted upon the system sepsis or sapremia, with their true line of symptoms and conditions.

With these pathological lesions what must be our line of treatment? In the forming stage, or incubative, destroy the specific bacteria. In the first stage neutralize the toxins and render them inert. In the second stage render the necrotic surface and its surroundings sterile, and, as in the first stage, neutralize the putrescent toxins that have entered the system. These are all the indications that are to be met except those of accident or complication, which in this paper have not been considered, and which, if the above indications have been met, will not have occurred.

As to the first indication, we can not forestall the accumulation of bacteria, for this has taken place when the patient has taken to his bed. The second indication, that of neutralizing the toxins, according to the light of medical science today can not be met in a specific way, but we find nature in all but rare exceptions able within a few days to meet the contingency. The third indication, that of sterilizing the alimentary tract, is within the range of possbility.

After the germ has entered the tissues of the bowel we know of no way to reach them; they propagate and elaborate, and we have the systemic intoxication. We have no specific for this toxin, consequently we must meet the febrile symptoms by the usual palliative measures. Hydrotherapy probably is the most efficient, and without delirious effects. Also arterial sedatives and eliminants.

We can not prevent nor lessen the degree of necrosis, and as this stage is the greatest danger point and the pathological lesions most amenable to treatment, we should concentrate our efforts, logically and scientifically, to lead our patient to a final recovery.

The germs that are most likely to infect the necrotic tissue are

intestinal parasites, and may readily be reached by antiseptics or germicides administered by the mouth. Calomel, by the action of the hydrochloric acid of the stomach being changed to the bichloride, is an efficient and very positive germicide. I believe the continuous administration of small doses of calomel during the first and second stage to be logical and beneficial. Also carbolic acid. McFarland in his work on bacterial pathology makes this statement, that "carbolic acid is one of the best antiseptics and germicides known." This may be alternated with the calomel, and if for any reason the calomel must be withdrawn the acid may be continued.

There are many other and equally good sterilizing agents from which the attendant may make his choice. The results obtained from the sulphate of copper treatment, which were excellent, were due wholly to its sterilizing properties. I usually commence early in the attack the administration of large quantities of prepared digestants, as powdered pepsin, liquid pepsin and pancreatin with soda, in order to insure as far as possible perfect digestion and to prevent fermentation or putrefaction of the stomach contents. This I believe to a large extent curtails the tendency later on to putrefactive infection. These, when given in large quantities, attack the necrotic tissue, liquefy it and hasten its removal, and when once removed and expelled we may have danger from that which has been absorbed, but the source of danger has been removed.

If the symptoms seem to indicate a violent intestinal lesion, with profound systemic intoxication, accompanied by moist skin, low, muttering delirium and a dry, dark red and cracked tongue, with filthy mouth and sordes, I have never found any remedy that so nearly met these conditions and removed them as turpentine. In fact, when the patient, at any stage of the disease, presents a dry tongue I prescribe turpentine and continue it until convalescence is established.

When the severe symptoms and conditions as above described are present, turpentine in from seven to fifteen minim doses every three or four hours usually quiets the delirium and renders the tongue moist, with a tendency to clearing. And if this amount fails to promote the above results I unhesitatingly increase the quantity even to sixty minims. How it does it I do not know.

But it probably acts as a powerful antiseptic and secondarily as a diffusible stimulant. When this grave or putrid condition is present it is more probable that the active cause is now systemic rather than local. And the fact is largely accepted that a specific disease manifests its individual pathological lesions through special organic toxins; and if, as we presume, turpentine has any power over and acts in any way as a specific it is not alone or in a majority dependent upon its local action, but that it is broken up by chemical affinity and new products formed, which, being absorbed, act as an antitoxin or opsonin. Turpentine in typhoid fever is by no means new treatment, but has been highly recommended by most of the old masters after long observation and thorough trial. Anders in his late work on "Practice," page 61, calls especial attention to turpentine in these words: "Turpentine in some cases fulfills a leading indication. When the tongue is dry and brown, the abdomen distended, the general prostration marked, and often muttering delirium present, the use of this agent constitutes the best mode of treatment."

We do not mention turpentine as a specific for the lesions or the conditions produced by the poisons elaborated by the typhoid or other bacteria, for it is not; neither can any agent be a specific, from the fact that the gangrenous surface of the bowel becomes a hotbed for the propagation of innumerable forms and varieties of bacteria, each producing its individual and characteristic toxin or ptomain, which enters the circulation. And an agent, to be a specific, would have to possess and have combined within itself the multiple power of a toxophylaxin or toxosozin in order that when prescribed it would destroy by toxicide action the combined poisons which had entered the system.

After the disease has reached the necrotic stage it must be treated upon general principles. And many remedies are equally efficient when in the hands of the well-informed and intelligent practitioner.

The Woodbridge abortive treatment, which was heralded a few years ago as specific, was, when carefully considered, simply a sterilizing of the alimentary tract and its contents; and this was commenced as the initial treatment as soon as the attendant was fairly satisfied that the patient had typhoid poisoning. The treatment consisted in the early and continuous administration

of calomel, guaiacol, menthol, thymol and eucalyptol—all positive and efficient antiseptic and sterilizing agents. This combination was administered every fifteen minutes for the first two days, after which the interval was slowly extended, thus securing the most thorough and uniform effects. Statistics gathered by Woodbridge show 150 deaths occurred among 7,827 patients treated, a death rate of 2 per cent. and a duration of twelve days. He follows with this statement: "This result proves that typhoid fever can be aborted." This result, to my mind, proves that typhoid fever can be held within its limits. And the twelve days spoken of is the limit, for within this time the effects of the typhoid toxin has exploded, the temperature is abating and the necrotic glands have exfoliated, and cicatrization is well under way, convalescence is established; but not one factor in the clinical history of typhoid fever has been aborted. Self-limiting diseases may be prevented by prophylaxis, but can not be aborted.

In the whole category of diseases there is none in which the patient may become more profoundly sick and approach more nearly the border line between life and death, and yet make a perfect recovery.

DISCUSSION.

Dr. Earp, of Indianapolis: The complications can be best met by the routine treatment and prophylaxis. I believe the bath is the single agent in the treatment of typhoid fever. Brand brought it into general use, and when we find that with it the mortality is as low as 3 to 5 per cent., especially in the hospital treated cases, it is worthy of consideration. It is a method of absorbing heat. The temperature is lessened, but if the temperature does not drop even so much as one degree we at least see the good results by the improved condition of the nervous system. There is a stimulation of the heart, an improvement of the tone of the kidneys, and hence the greater probability of the elimination of the typho toxin.

I endorse the use of turpentine. Its usage has existed for years, yet we have found nothing better, and if there is an intestinal antiseptic of any importance whatever it is turpentine. We may get good results with carbolic acid. I have used it for years. It will depress the heart, and the indication is to stimu-

late it in a case of this kind. If the Brand bath treatment is properly used we are less likely to have a softening of the Peyer's patches, delirium will be less marked, the heart is likely to remain strong, and the course of the disease will be shortened. Water should be used in the form of a cold tub bath when the temperature is up to 102.2 or over, but we can also use the method of sponging. Where we use sponging as a method and then cover the patient up again we do not get the results; it is the evaporation of the water from the skin of the person that gives us the lowered temperature. In other words, when we have an excessive heat the skin is dry and there is no evaporation, and it is the evaporation by reason of the sponge bath, so called, that gives us a lowered temperature.

Dr. Pigman: I would like to say that I think that typhoid fever has passed the intestinal tract before we are called and is well into the liver, the kidneys and the blood. Now in regard to cold baths. The essayist does not say so much about that. There was a time when it was claimed to accomplish benefit by a reduction of the temperature, but even now they will not claim so much for it. The new theory of opsonins that has been opened up within the last year will clear this up. There is no question but that the cold bath increases evaporation, and that is along the line of our theory. Now the doctor who has just preceded me in this discussion said that the most important thing in the treatment of typhoid fever is the bath. Well, I disagree with him there, for in my opinion the most important thing is the diet. And I believe that milk should be the most important part of the diet. I mix the milk with water from one-half to two-thirds.

Dr. T. Victor Keene, of Indianapolis: I do not agree with the essayist in his treatment; in fact, it seems to me that his statement of the course of the disease and his treatment are entirely contradictory. In the average case twenty-one days elapse from the time the typhoid bacteria enter the body before they have increased in numbers sufficiently or produced a sufficiency of toxin to produce symptoms. On about the fourteenth day the typhoid bacteria enter the blood, having previously to this time resided solely in the intestinal tract. Now if we are fortunate enough to see our patient before the typhoid bacteria have left

the intestine and migrated in goodly numbers into the blood then vigorous, energetic measures to cleanse the intestine of bacteria ought to be of value. Theoretically, if we could, before the typhoid bacteria leave the intestinal canal, completely destroy all the typhoid bacteria there we would abort the disease, and our symptom complex would be entirely dependent upon the already absorbed toxins produced by the bacilli prior to their being destroyed by the intestinal antisepsis. But any one with surgical experience knows how difficult it is to render one's hands surgically clean and relatively noninfectious. To sterilize a living tissue is physically an impossibility; the best we can hope to do is to render such tissue as relatively free from bacteria as the location and nature of the tisue will permit.

However, aside from the physical impossibility of effectively disinfecting the intestinal canal, I maintain that there does not exist any therapeutic indication warranting the effort.

I doubt if one case of typhoid in five thousand is seen before the bacteria have left the intestine and invaded the blood stream. The organisms leave the bowel, as before stated, as about the fourteenth day; the patient seldom feels definitely ill before eighteen to twenty-one days, so that should the patient seek advice at the very onset of the disease, as he feels symptoms, the condition is no longer a local infection of the bowel but a systemic condition, with the causative organisms being carried in the blood stream and taken over the entire body. I see no indication for the use of carbolic acid in typhoid fever. As an intestinal antiseptic it is probably the least efficient we have at hand. A drop of carbolic acid placed in a bowel loaded with typhoid bacteria would about as effectively disinfect the bowel as a drop of cold water would temper a bathtub full of steaming water.

Typhoid is no more a local disease at the time it is offered for treatment than is syphilis, and it is just as desirable to excise a hard chancre as it is to attempt to affect the course of typhoid fever by local intestinal antisepsis. Practically, excision in syphilis is of clinically as great value as intestinal antisepsis in typhoid.

But a few words as to diet. I believe in allowing a typhoid patient a more liberal diet. I give my patients practically anything they want, carefully avoiding overloading the stomach with

too goodly a quantity and religiously avoiding foods which are not easily digested and liable to remain in the intestine too long or which would contain hard, gritty particles. Particularly to be avoided are the foods, such as corn, beans, etc., which contain an insoluble capsule.

As to milk. Do not allow the patient to drink it as he would water, for if he does there will form in the stomach a very large curd or cheese. Instruct him to take his milk in broken swallows, as then the milk is more liable to form into a number of small curds or cheeses, and its digestion will be more rapid. It is much like the melting of ice. A given weight of ice in small chunks melts much more rapidly than the same weight of ice in one large piece.

Dr. B. H. Perce, of Anderson: Let us not go on with the dictum of Osler put forward for the conduct and guidance of medical men in the treatment of typhoid fever. It is not the bacteria itself that produces the fever, and we all know that, and we know that it is the toxaemia, and while a few bacteria may get into the liver and the spleen and the lungs and the various other organs, we do not try to destroy them by an intestinal antiseptic in these regions; but it is those in the bowels themselves that we must attack, and I say to you, gentlemen, that the elimination and use of an intestinal antiseptic will reduce the fever without your hydrotherapeutics, and it will hardly ever be necessary to give a sponge bath in the case of the ordinary typhoid fever where you have used elimination and the antiseptic treatment in the bowels. This has been the experience of fifteen or twenty years with me, and I know from personal experience whereof I speak.

Now, of course it is not necessary to enter into a discussion of what antiseptic to use. I agree with the last speaker that carbolic acid can not be given in sufficient quantities to answer the purpose, and you will find that if you treat the bacteria in the bowels from day to day and from hour to hour that your toxaemia will not bring on the results you have when you fail to use an antiseptic.

Dr. C. H. McCully: One of the statements of the gentleman last on the floor appealed to me. I am not very old in the prac-

tice of medicine, but I do believe I know this. I know that I believe that in typhoid fever we do not seek so much to destroy the bacteria as we seek to render them inoperative. All we dare hope to do is to render them inoperative until such time as we can get them out.

Dr. Montgomery: Gentlemen, the point I wished to bring out in this paper is that typhoid fever is a germ disease, and, like almost every other so-called germ disease, that the germ is self-destroying; the toxin which it eliminates destroys the organisms, and if they escape into the general circulation, as has been said, it will be taken care of by the corpuscles. You find that we have few vegetable organisms in the circulation; we have few of any kind; they can not live there for any length of time; they must go out and locate in the tissues or perish.

GALL-STONES: THEIR MEDICAL TREATMENT.

BY T. C. KENNEDY, M. D., OF SHELBYVILLE.

A study of the diseases of the upper abdominal zone presents many difficulties in diagnosis. Such a great variation in the pathological condition may exist, and the anatomy is so complex that an exact diagnosis is all but impossible. An infection in one part so readily extends to another that the whole symptom complex baffles the skill of both the internist and the surgeon. The pain and tenderness in the gall-bladder region may be purely of nervous origin, and such an occurrence can not be ignored. Ewald reported such a case last year in a woman thirty years of age who had suffered with intense pains in the hepatic region which had resisted all treatment, and she had become a victim of morphinism. At the operation all the organs were found normal. Infection existing from the duodenum through the common duct to the liver and gall-bladder, and through the duct of Wirsung to the pancreas produces a pathological condition the extent of which it is hard to decide.

It is a common error not only of the laity, but also of many physicians, not to associate pain in the hepatic region with gall-stones unless the paroxysm is acompanied with jaundice. Jaundice is a very infrequent symptom of gall-stones. Murphy says that less than 14 per cent. have this symptom at any stage of the disease. Many cases are diagnosed as indigestion, neuralgia of the stomach, nephritic colic, etc. Usually a differential diagnosis must be made between gall-stones and ulcer of the stomach, cancer of the stomach, duodenal ulcer and appendicitis.

Two years ago before the surgical section of this society the essayist read a paper, from which is here quoted: "In many cases of disease of the gall-bladder we must resort to operative procedure, but we must be diligent in our search for those cases that will yield to internal medication and treat them rationally with complete relief to the patient. Very often it is impossible to make a diagnosis of the exact condition, but we are called upon

to decide whether it is a case that will yield to medical treatment or is one that can only be cured by operation." As surgeons we are inclined to scoff at these cases from a surgical aspect, and while I am firmly of the opinion that the diseases of the biliary tract due to gall-stones are, strictly speaking, surgical diseases, yet quite a large number can be cured by internal medication. It is now generally accepted that gall-stones can not be dissolved by any remedy that can be taken into the stomach, but much can be done to allay the cholecystitis and cholangitis to which the gall-stones give rise.

Monyhan says: "Many of the symptoms in the lighter attacks of gall-stone disease are due to a mild cholecystitis. When the gall-stones become blocked in the entrance of the cystic duct an infection speedily follows, effusion takes place in the gall-bladder and inflammation of its walls speedily results." We do not attempt to treat the gall-stones, but we can treat the infection of the biliary passages, and when the inflammation subsides no symptoms remain. Gall-stones in an unlimited number of cases lie quietly in the gall-bladder without giving rise to any symptoms. The abdominal surgeon frequently, when opening the abdomen for other causes, finds a gall-bladder filled with stones that have never given rise to any symptoms. It has been said that only about 5 per cent. of gall-stone subjects feel anything of their presence and 95 per cent. remain free from suffering.

Even though it may be said that these cases should be operated, let me ask what is to be done with the large number of cases that refuse operative measures. Can we be of any service with internal medication? The great benefit that comes from operation in these cases is long continued drainage of the bile ducts and gall-bladder. If it is infection that changes the cholelithiasis from a latent to an active condition is it not possible by internal medication to overcome the infection and again have the gall-stones in a latent state? The efficacy of treatment lies in the direction of reducing inflammatory processes and not in the expulsion nor solution of the gall-stones.

My time is too short to enter into the symptomatology or pathology of gall-stone disease, but I simply desire to elicit a discussion as to the limitation and benefit of medical treatment. These cases are almost invariably accompanied with gastric or

gastro-duodenal catarrh. It is therefore necessary to get the whole intestinal tract in as healthy a condition as possible. As a rule these patients are of a sedentary class and must be almost compelled to take exercise. Women of course more than men are given to sedentary habits and are more prone to remain indoors. Exercise favors the flow of bile.

Many remedies have been suggested in the treatment of those cases with which you are all familiar, such as the olive oil, Durandes mixture, chloroform, etc. It is well known that the salycilates act as an antiseptic in the biliary passages, but it is now claimed that superor power is manifested in the succinate of sodium. In the ordinary text-books it is difficult to find any extensive mention of this remedy and its therapeutic action. I have succeeded in getting the following notes concerning this remedy:

The treatment of biliary calculi with sodium succinate is comparatively recent, but the results have been so markedly beneficial as to warrant making some suggestions concerning the manner of its action. It is well known that the fatty acids increase the flow of bile. Succinic acid is a dibasic acid of the fatty acid series, and consequently would have the effect of rendering the bile less viscid. This is a very desirable result to secure. A solution of sodium succinate dissolves cholestrin. If fat from sheep's wool (commercial adeps lanae) containing a large proportion of cholestrin be digested with a solution of sodium succinate, this solution extracted with ether and the ether evaporated, a residue of cholestrin is obtained. This proves that sodium succinate dissolves cholestrin, which is one of the chief constituents of biliary calculi.

Therefore the reasons for using sodium succinate tablets in the treatment of patients suffering from gall-stones are: (1) Its power to dissolve cholestrin. (2) It makes the bile less viscid. (3) It is an antispasmodic and sedative. This is most conveniently administered in uncoated five-grain tablets. One or more of these should be given every two or three hours. No untoward effects of any kind are reported. Following operations for the removal of gall-stones free use of these tablets is often desirable as a means of preventing a recurrence of the trouble.

The use of olive oil to facilitate the discharge of gall-stones

is often advised. Massive doses are used, and this is a serious objection in many cases because nausea may result. This is true of even the best grade of oil The reasons advanced for the favorable action of olive oil in these cases are: (1) It is a lubricant. (2) It is a cholagogue, "unquestionably increasing the secretion of bile, which may account for its apparent influence in favoring the expulsion of these concretions." Sodium succinate does not cause nausea; the dosage is easily handled and the use of it can be continued as long as necessary without objections from the patient.

While we believe that gall-stones can not be dissolved in the gall-bladder, yet every internist has seen cases in which the patients got rid of their symptoms by internal medication, and believed themselves to be well and never had recurrent attacks. When we consider the fact, as already stated, that only about 5 per cent. of gall-stone subjects feel anything of their presence is it not probable that by internal medication we can restore the normal condition of the gall-bladder and biliary tract and have the gall-stones in their latent state in at least a fair percentage of our cases?

The treatment of these cases at some mineral spring is of unquestionable benefit Nearly every mineral spring is advertised as a specific in all forms of diseases of the liver, but those of the alkaline-saline group are the ones that are indicated. Crook says: "We do not know whether the efficacy of these waters depends solely upon the formation of a thin liquid bile, by which gall-stones are readily washed downward, or whether the bile is rendered so strongly alkaline as to effect a solution of the components of the stone." But, as Neimeyer has justly remarked, "we should not delay prescribing this treatment till the mode of its action be explained." By their detergent effect these waters also act well in icterus due to catarrh of the bile ducts and to chronic congestion of the liver.

A moderately strong alkaline-saline water may be found of service in the symptomatic gastric and intestinal disturbances which are liable to be present.

It may be stated that the sphere of mineral waters in medical practice is chiefly auxiliary or supplemental to other forms of treatment. A serious drawback to the treatment is the indis-

criminate manner in which they are used. Patients going to the springs rarely think of consulting the resident physician in regard to their condition. Some physicians who know as little about the action of the water as the patient have the temerity to advise as to the best method of using the water. I am confident that the water of some of these springs is an effective remedy in gall-stone disease, and I always advise my patients to consult the attending physician and be entirely under his guidance.

Kehr says: "An internal treatment or a Carlsbad cure I recommend to patients:

1. With acute obstruction of the choledochus so long as it proceeds normally (if it drags along, if fever occurs, if acceleration of the pulse, if cholangitis symptoms appear then operation may be considered).

2. With inflammatory processes in the gall-bladder, with and without jaundice, if they occur rarely and not too violently. Indeed the pain does not always correspond to the severe pathological changes in the bile system and in the abdomen, so that the subjective troubles of the patients ought not to be for us physicians decisive, but we will in such cases, even with the clear data of palpation, not always succeed in our recommendation for operation, since the patients yield themselves to operation only because of unendurable distress.

3. With frequent colics, each time attended with the passage of stones. If the colic recur very often without the passage of stones then operation is indicated.

4. Who suffer from obesity, gout, diabetes or in whom on account of affections of the heart, lungs, kidneys or liver the danger of anaesthesia come into consideration.

5. Who have undergone operation. I have already repeatedly said that I would most gladly send every gall-stone case which had undergone operation to Carlsbad."

DISCUSSION.

Dr. C. K. Bruner, of Greenfield: One or two of the things I care to emphasize the essayist has already mentioned. I think perhaps he ought not to have called his paper gall-stone disease unless he emphasized the term "disease," because when we have a stone present we have a surgical disease that can not be relieved

by any other means. To illustrate the fact that gall-stones may be present for many years without giving rise to many symptoms in the patient is shown in a case that had Bright's disease. At the autopsy we found four large gall-stones as large as the end of my thumb that had been present without giving rise to symptoms. About fifteen years before he had had trouble with the liver. In discussing the same subject at French Lick I called attention to the fact that so frequently following liver trouble where jaundice has been present I find as a consequence of it disease of the kidney, and in speaking of it in this way I asked if any one present had another explanation of it. A gentleman from Fort Wayne said the presence of bile in the blood and its elimination by the kidneys was one of the most potent factors in causing Bright's disease. I have seen one or two cases of what we might call gall-stone disease. One case came under my care and was fatal within forty-eight hours, in which there had been no previous history of disease of the liver. The autopsy showed an immense number of gall-stones. In this case I believe the construction of the gall-bladder caused a rapid precipitation and formation of gall-stones. I don't know how long it continued.

For years my remedy has been phosphate of soda, and I still use it. Generally in an acute case I give it before meals in hot water for a long time, and where I have a catarrhal condition of the gall-bladder I am positive that it will give my patients relief if they will continue it for eighteen months or two years. In more than a dozen cases I recall the symptomatic cure. I have also used succinate of soda, and it has given me better results even than the phosphate. In these cases where the bile is not furnished to the intestinal tract we ought to supply it by giving ox gall, and I invariably use it to correct the indigestion that the absence of bile causes in these cases.

Dr. Geo. W. Kahlo, of French Lick Springs: In my experience I have seen many cases of what seemed to me gall-stones in which jaundice was not present. It depends on the duration of the trouble and whether or not the obstruction of the duct is complete. If it is an irregular stone it allows the passage of bile around it, and you do not get jaundice. Dr. Kennedy quoted from Professor Kerr as to the use of the medical treatment in these cases. We see cases at autopsy with gall-stones that never

gave rise to symptoms of any kind. We have all had cases that presented unmistakable evidence of cholelithiasis that have subsequently recovered and had no recurrence of the disease. Recurrent cases of hepatic colic are undoubtedly surgical; yet a large majority of the cases that present symptoms of gall-stone disease are curable by less heroic measures, and among the best of these I believe is the alkaline-saline waters. I have seen very excellent results during my last year's experience. While I do not believe they will dissolve gall-stones, they will undoubtedly increase the amount and fluidity of the bile and relieve the condition which precipitates cholesterin, which is at the base of the formation of gall-stones.

Dr. Harry Sharp, of Jeffersonville: I believe jaundice in gall-stones is rather the exception than the rule. Personally I have seen several cases, demonstrated upon operation to have been gall-stones, in which there had never been any jaundice during the entire course of the trouble, and I think Monyhan states that it is rather the exception than the rule. I have in mind one case where a man had three or four attacks of severe biliary colic, with complete cessation for fifteen years, and afterwards had four very severe attacks, was operated and nineteen gall-stones removed varying from the size of a pea to the size of the little finger, all of a dewberry shape, due to the coalition of the smaller biliary calculi. There was not a single one that was smooth facetted.

In regard to mineral waters, I doubt whether they have any effect only upon catarrhal conditions of the biliary tract. Of course they may increase the fluidity of the bile. I know nothing of the succinate of soda any further than that I have used it in some of the catarrhal conditions.

Dr. W. H. Dinsmore, of Kramer: For something like nineteen hundred years there have been doubters. Thomas nineteen hundred years ago doubted some things. Now right here in Indiana we have some mineral springs For years the medical profession have taken them up, and they have seen great benefits therefrom. The only thing I can say to you gentlemen who doubt that these symptoms are relieved rapidly and stay relieved perhaps for many years is to come and see. We have seen them. We have case after case, and when you see them there you will believe these

things. Any one of you gentlemen I am sure will be very gladly entertained if you will come to any of these mineral springs, and if you will send some of your patients there and watch the results your doubts will at least to a certain extent vanish.

Dr. T. B. Noble, of Indianapolis: It is true there have been doubting Thomases for nineteen hundred years, and they are yet on earth. Here is one of them. Now, relative to the cases that are relieved by a sojourn at these springs. I operated on one a few days ago, taking a stone from his common duct. I have in my pocket at this moment a stone removed from the ampulla of Vater eight years ago, a stone that had been fed on the succinate of soda for weeks and weeks until by recurrent attacks of chills and fever that patient had been brought to the lowest extremity. Her stomach and pylorus and duodenum and the omentum and the hepatic flexure of the colon were agglutinated together in a mass that greatly distorted normal conditions and normal functions and left that woman a cripple for life. These are the sequences that follow upon gall-stones, which, when once formed, are treated any old way except the right way, and that is their removal. It has been admitted that gall-stones when once formed are surgical. Now that is true and that is right, and I submit if that be true and we know the multiple death-dealing pathological sequences that come in upon the presence of these stones that neither you nor I can foretell or see or diagnose—when these things are going to occur are you going to submit the patient to procrastination and allow the patient to come down in a crippled condition and invalidism and death when, if taken early, the removal of the stones is simple, it is easy, it is curative, it need not be attended by any mortality. Take the case that is fed for two years on phosphate of soda. I have stones in my office bathed in phosphate of soda, if such a thing is possible, while they remained in the gall-bladder two years, and the woman was never cured of gall-stones. If allowed to remain in the gall-bladder, if they produce nothing else they will kill more people from cancer than the early, proper, prompt operation will kill in uncomplicated cases.

Dr. H. O. Pantzer: There is no doubt that cholelithiasis exists in a great number of cases where absolutely it produces no symp-

toms. Then there are other cases in which we have gall colic unaccompanied by evidence of fever, where the gall-bladder is making, if you choose to so call it, physiological efforts to discharge its contents of stones. Then we have cases associated with fever. Therapeutically regarded, each group has different indications. The cases unaccompanied by fever or by colic must be ruled out as at all coming under at least surgical consideration. Riedel in his statistics computes that two million out of the sixty million Germans have gall-stones, and that only one hundred thousand have trouble from them. To apply surgery to all the two million cases because one hundred thousand become troublesome would be overdoing it. It would end with damage to our patients and would be in violation of our surgical conscience. Having given a case with gall colic, it is a question of interesting moment whether the patient has any inflammatory symptoms with the colic. This is a matter depending upon close observation. Cholecystitis ordinarily has a temperature that is not constant. Doctors who have seen patients in the morning and found no rise of temperature, and afterwards see them in the afternoon often find variation. Cases previously supposed to have no temperature may show such of 102 degrees or more. Even suppurative or gangrenous cases have a temperature that not infrequently is intermittent. Having determined that a given case belongs to the second group, namely, gall-stone colic without inflammatory symptoms, the case may be treated tentatively. The passage even of large stones by the physiological activity of the gall-bladder can occur and may be hoped for in a large majority of cases. Cases belonging to the third group, namely, of cholelithiasis accompanied with temperature, must be regarded as serious, and are properly at once cases for consultation between internist and surgeon. Even these cases can recover without operation, but a large majority will require surgical relief. Many of the cases which temporarily improve yet give rise to more serious conditions and complications later. Many should have surgical treatment at once or are certain to end fatally. Having expressed my views in a paper and its subsequent discussion before the Surgical Society yesterday, I feel that I should speak no longer on this subject at this time.

Dr. B. H. Perce, of Anderson: Not being a specialist of any kind and not being interested whatever in mineral springs, the discussion today is rather confusing to physicians that are depending upon conservative measures, and I am surprised at some of the deductions. We have men who think they can knock a stone out of the gall-bladder with the greatest ease. I think the devil himself if consulted would do it with hell fire and brimstone. But it strikes me that all the gentlemen are right. Some are benefited by the springs, others by the use of remedies suggested by my friend the essayist, and there are some that require absolute surgical interference, and it is a question for us to decide at the bedside. There was one remark made that struck me as rather peculiar, and that was that gall-stones were a cause of cancer. My understanding is that cancer is caused by an embryonic error as a rule. I think there is a great deal of benefit to be derived from the springs, more perhaps from suggestion than from the water. The patients go down there and have a general good time and come back improved. As has been said, a large number of autopsies show gall-stones without symptoms, and this leads me to think that surgical conservatism is the proper course.

Dr. F. C. Heath: Any source of irritation may have something to do with the formation of cancer.

Dr. T. A. Wagner, of Indianapolis: In the last eight years I have had five cases operated on for gall-stones, and they afterward died from cancer. I merely give you these facts to think about.

Dr. C. S. Bond, of Richmond: I want especially to endorse the paper that has been read as against this promiscuous operation upon a person with gall-stones by persons very often with little experience with the knife. As members prominent in the state society we must not endorse that dictum. Oftentimes men remote from the centers, without proper education in operations of this kind, operate on persons who come to them with gall-stones. It has been said by a surgeon here, and I think a good surgeon, that this operation is attended with very little mortality. Now it is inconceivable that we should do an operation of that kind

without mortality. Patients will get well, but you could not stick them with pins without having some mortality. It does a surgeon harm to come before an association like this and say that an operation as serious as opening the abdominal cavity is attended by no mortality. We do not often get all the statistics. More often we get the side that is favorable, and the other side is left to the undertaker.

There is some deviation in the normal health that produces gall-stones. We do not know what it is, and therefore we can not always say what is the pathological state which precedes gall-stones; but we do know that bad health, bad living, whatever that may imply, eating too much, all have to do with the formation of gall-stones. We can tell patients beforehand when they are forming gall-stones. They pass them after explosions of colic. It is not unusual for them to pass dozens of them. Patients such as that can be taken in hand and the prevention of further stones may be made. I do not believe in this sort of conservatism that says you can not do anything with a man who has a tendency to produce gall-stones, but by right living we can overcome this.

Dr. F. C. Heath: In the absence of Dr. Noble I would like to correct a misstatement. His statement was that in early uncomplicated cases there was no mortality.

Dr. A. S. Jaeger: I believe the essayist should be complimented on the conservative stand he has taken. I always did think when we had a case of gall-stones we should take them out. When a man like Kerr, who is the greatest gall-bladder operator in the world, tells us it is only necessary to operate in a few cases we should sit up and take notice of these things. Now the question is does every operation for gall-stones cure the disease? I do not believe it does. If the stone is caused primarily from an infection of the gall-bladder alone then there is a chance that the operation will cure, but if the stone is the result of some derangement of the bile before it enters the gall-bladder I do not believe the removal of the stones will cure the disease, because the same condition that produced the stones still exists. We also see lots of cases in which there are terrific pains where there is a cholecystitis. The occlusion of the gall-bladder, whether due to bile, to a catarrhal exudate or some inflammation, if we have an

occlusion of the duct we can have the same clinical sequences that we have if stones are present.

I think the operation is a serious thing. My experience is perhaps limited, but it is not easy for me.

Dr. Theo. Potter: In the interest of clearness I think it well to say that what we are treating is not the gall-stones at all, but the disorder that accompanies them. By the medicinal treatment we do two things. In the first place we so manage the diet and habits and conditions of the patient as to lessen the formation of the gall-stones, and I think it is quite reasonable to think we may do that. The other thing to do is to lessen the disorders of the biliary passages associated with gall-stones. Just what to do it is not necessary to discuss. To lessen the tendency to their formation and to relieve the disturbances associated with gall-stones is the thing, but as for the gall-stones themselves there is but one treatment, and that is to make a hole and take them out.

Dr. T. C. Kennedy: I thought I made it plain in my paper that this is essentially a surgical disease. The trouble with the surgeons in the city is that they will deny the possibility of relieving these conditions. As a matter of fact he gets them after they have given the country physician all kinds of trouble, and they go to the surgeon believing if not operated they will die. But many cases with recurrent attacks get entirely well, or if they do not get well and the stones are not passed they become in the latent condition and they are satisfied, and that is what we have to try to do. Whether the succinate of soda or olive oil or any other remedy is of any efficacy I do not know, but I know after using these remedies in a large percentage of cases they do get well. As Dr. Bond says, men out in the smaller places should not operate. I live in a small town, but I operate these cases when I deem it necessary, and I believe my statistics will bear me out that I have about as good a percentage of recoveries as some with a larger experience. The only case I have had to die after operation I had the pleasure to do in Indianapolis, and I believe if I had done it in Shelbyville it would have gotten well.

I do not believe there is a remedy that will dissolve gall-stones in the gall-bladder. In discussing Dr. Pantzer's paper yesterday I used the term gall-stones instead of cholesterin. The succinate

of soda will keep cholesterin from precipitating, and it is a constituent of gall-stones. There are cases that are necessary to operate, but I would like to ask Dr. Noble if he would operate on the one million nine hundred thousand cases spoken of that have no symptoms. It is the same in appendicitis. I do not believe every case should be operated. I have seen them recover without a recurrent attack, and I have seen cases of ulcer of the stomach cured, and it is considered a surgical disease. I do believe in conservatism in these cases as in all other surgical work.

CHOLECYSTITIS.

BY HUGO O. PANTZER, M. D., OF INDIANAPOLIS, IND.

Recent observations and investigations have added greatly to our knowledge of biliary diseases. Bacteriology, toxicology, postmortem findings by the pathologist, but more than all the autopsies on the living body by the surgeon have combined to develop a hitherto dark and unknown pathologic field. The cases as seen by the surgeon, both at critical late and early stages, have been remarkably instructive and impressive.

It shall be the object of this paper briefly to set forth some of the newly developed pathology and its bearing upon practice. The part chosen for presentation here is inflammation of the gall-bladder not or associated with gall-stones. This selection is the more mete because of the paramount significance of cholecystitis. It is fundamental to most of the diseases pertaining to the deeper biliary tracts and the liver and pancreas. The sources drawn upon are largely the current literature, surgical text-books and the writer's own experience. In the interest of brevity and fluency of narration authorities will be but sparingly mentioned. It is intended that this article, rather than be comprehensive and methodically didactive, should suggestively reveal the potent pathology lurking in these diseases and make wary for timely recognition and for the possibilities of cure.

Until recently there was little more known than that stones form occasionally in the gall-bladder; that they consist of cholesterin, and that in time they develop more or less painful and dangerous attacks of colic incident to an effort at their expulsion by the gall-bladder. Little was known of how gall-stones are formed, less about their frequency of occurrence and least about their insidious course and sequelae.

Many painstaking investigations have substantiated the inflammatory origin of gall-stones and biliary diseases. Like the vermiform appendix of the colon, the gall-bladder has been shown to be a convenient and catchy fastness of the pathogenic germs.

infecting the human body. The species most commonly found associated with gall-bladder inflammation are the typhoid bacillus, the colon bacillus and the ordinary pathogenic staphylococci and streptococci. The tubercle bacillus is found there at times in great numbers, but rarely attacking the tissues of the gall-bladder. The tubercle bacilli continue to live in healthy bile, and their morbid activity depends upon their transmission to susceptible tissues elsewhere in the body. Measles and scarlatina, appendicitis and other enteric diseases, pneumonia, influenza, the various forms of pelveoperitonitis have frequently been clinical forerunners of cholecystitis. The former opinion that healthy bile is possessed of bactericide property has been modified to read that its effect is rather to inhibit bacterial propagation. The bile in the bladder and upper ducts of the normal individual commonly is sterile; that of the patient having gallstones usually is found infected with disease germs. The bile taken from patients operated upon for diseases other than cholecystitis commonly is found sterile; that of cases operated for gall-stones in 75 per cent. to 85 per cent. is possessed of disease germs in the bile bladder. The bile remains undisturbed by them as long as the outward flow of bile is free. When this is hindered the bile at once becomes infected. This is true in increased degree when the common duct is obstructed. Here an ascending infection from the duodenum follows speedily. Experimental investigation has shown that subacute inflammation of the gall-bladder is particularly likely to be followed by the formation of stones. This excites the production of cholesterin and bilirubin calcium by the mucosa of the gall-bladder. These substances precipitate about the microbes and the exfoliated epithelia floating within the bile. In such process the stasis of the bile is regarded an essential, or at least an important factor. The precipitate has no tendency to cohere or adhere to foreign bodies. Moynihan (Gall-stones and Their Surgical Treatment, 1905, pp. 45 and 46) sums up the subject of experimental investigations with the following conclusions:

1. The chief constituents of gall-stone, cholesterin and bilirubin calcium, are produced by subacute inflammatory changes in the mucous membrane of the gall-bladder, which result in desquamation of epithelium and increased production of mucus.

2. The injection of a virulent culture of micro-organism produces an acute cholecystitis, without the formation of gall-stones.

3. The injection of attenuated cultures causes no change, if drainage from the gall-bladder is free.

4. Retention of bile, brought about by the introduction of sterile foreign bodies, does not cause the formation of stone.

5. If retention of bile be caused by ligature of the cystic duct or by the introduction of foreign bodies (which cause a stasis of the bile adhering to them and between them) and an attenuated culture be injected, stone formation will occur.

6. The gall-bladder is the chief seat of the formation of gall-stones.

7. The clumping of typhoid bacilli within the gall-bladder may possibly furnish an explanation of the occurrence of cholelithiasis after typhoid fever.

The bacteriologic examination of gall-stones has revealed (J. Funke, N. Y. Med. Jour., Dec. 1, 1906) that soft calculi invariably yield bacteria; hard stones, crushed in smears and inoculated, show live bacteria in a little less than one-half of them. The bile at the same time may be sterile.

The frequency of gall-stones is greater than formerly was even suspected. Riedel, an eminent German authority, computes that of the 60,000,000 inhabitants of the German Empire, 2,000,000 are possessed of gall-stones. Very happily he may at once add the consoling news that 1,900,000 of these continue through life to never become a disturbing factor. This means that the stones maintain latency throughout the life of the individual. One hundred thousand, or only 5 per cent., suffer consequences, varying with the form the disease takes. In the former 95 per cent., i e., the 1,900,000, the patho-anatomist finds stones without detecting any changes in the walls of the gall-bladder or its environment. The bile which floats about the stones is clear, of normal consistency; the mucosa is not inflamed, serosa and muscularis show up normally. Inquiry among the relatives of those deceased commonly reveals that they have scarcely ever complained of stomach uneasiness and even less of violent colic; nor have they been under treatment for enlargement of the liver or icterus. Likewise the surgeon, incidental to

laparotomy done for other affections, often finds a gall-bladder filled with stones, without the patient being able to recall specific symptoms. In such cases the stones continue in the latent stage, as long as the cystic duct remains open, and the in and out flow of bile is not interfered with. As long as there is no infection and inflammation, all symptoms will be found wanting.

Statistics of other lands than Germany indicate a similar frequency of occurrence of gall-stones.

The sources through which the gall-bladder may become inflamed and infected are many. It is a somewhat moot point in the pathology whether the origin is by the blood ways or the lymph channels; or by the ascension of bacteria through the common any cystic ducts into the gall-bladder; or by the excretion of bacteria with the bile, in instances where the hepatic function fails to exterminate them in their course through the liver. No doubt all these causes can operate to produce cholecystitis. Riedel, the authority above cited, is a firm believer in another sorce of gall-bladder inflammation, namely, the mechanical irritation resulting from stones within the gall-bladder, i. e., foreign body inflammation. Kehr and Naunyn contend against this source of inflammation. They assign to stones only predisposing quality. This point will be considered later when the migration of stones is discussed.

Cholecystitis, like an inflammation of other organs, is serous or suppurative; rarely hemorrhagic. It may become putrid, or partake of a diphtheritic, necrotic or gangrenous character. During these different degrees of inflammation the gall-bladder changes its appearance and form greatly. The inflammation may be acute, subacute and chronic.

Kehr, in a recent article, "Zeitschrift fuer aertzliche Fortbildung, Dec. 1, 1906," unfolds a graphic picture of the pathology of this subject, which every one interested should read. In the following description of the pathology of the gall-bladder, Kehr's article has been freely drawn from.

A gall-bladder, seen in the living subject, may appear normal, and yet shortly before have been the seat of a severe infection. Operated at the point of latency, there may be no traces of inflammation found; but during the attack the gall-bladder not rarely is found a bluish-red, highly-inflamed tumor of the size, it

may be, of a foetal head, whose surface is covered with heavy, fibrinous laminae and whose mucosa is covered with deep ulcers, showing evidence of beginning necrosis. Serosa and muscularis swell considerably, at times attaining a thickness of one cent. to one and one-half cent. Like in other organs having a peritoneal coating, the inflammation may implicate the exterior of the gall bladder and adjacent organs, thus causing local peritonitis, a so-called pericholecystitis. This commonly is of sero-fibrinous, rarely of a suppurative nature. The exudate may become absorbed, or encapsulated. As remnants of such inflammation there may persist adhesions with adjoining organs, which become a new source of disease, varying from band-like to broad-surface adhesions. The former cause colicky symptoms that can not be differentiated from those of gall-stone origin. The latter may form adhesions between gall-bladder and the parietal peritoneum, the colon, the omentum, duodenum or pylorus. They may, by displacement of the duodenum, fixation of the pylorus, eventuate in dilation of the stomach, and stenosis of the pylorus. Surprisingly often even the most severe inflammation of the gall-bladder, without remedial measures, may become symptomless and cured. "Whether chologen, Karlsbadersalz, olive oil, opium or castor oil has been given is immaterial" (Kehr), nature conquers the illness by the extinction of the infection. When the tension of the distended organ ceases all pain stops. Pain is the most formidable symptom. The patient considers himself cured, and the attending physician, because he finds no longer a tumor of the gall-bladder and the tenderness to pressure is past, assumes that he may have been mistaken about his previous finding. When such a case comes to section, great can be our surprise to find that notwithstanding the symptomlessness of the gall-bladder, it is filled with pus. These are the cases which to the uninitiated are surprising, though the busy abdominal surgeon encounters them every now and then. Less severe are the symptoms in the class of cases, known much longer as hydrops of the gall-bladder. When the cystic duct continues closed by a stone, and the infection dies out, or if at all from beginning the inflammation remained serous there persists a cystic tumor of the bile-bladder. This may exist without symptom simply because there is no active infection existing. Inasmuch as bile no longer flows

into the bladder, the fluid contents become in time clear as water. The tumor may grow without symptoms to a size simulating an ovarian cyst, as which it has frequently been diagnosed. The increasing thinness of the walls may lead to rupture. More frequent are cases wherein cure follows the reopening of the cystic duct, or wherein the gall-bladder discharges itself into the stomach or bowel. In this way there is established a fistulous communication between these organs and the gall-bladder or common duct. This may lead to a cure. More commonly real trouble ensues when a stone is advanced into the common duct, there partially obstructing the in and out flow of bile. With infectious elements at hand—both within the gall-bladder and in the near bowel—sooner or later there occurs the grave and fatal infection of the upper gall-ways, eventuating in hepatic sepsis and death; or cachexia, inanition and gradual exhaustion. In these latter cases the excision of the gall-bladder, and drainage of the hepatic duct, though involving peril, may yet bring relief.

Kehr says that in the majority of cases the calculous cholecystitis may become temporarily symptomless, and the minority of these may heal fully. More common it becomes chronic; the bile-bladder walls become thickened, the mucosa develops superficial or deep ulcers, perforations into another viscus or into the free peritoneal cavity follow; the cystic duct may gradually stenose, so that the outflow of the bile-bladder secretion is hindered, and their retention keeps up the chronic infection. The cystic duct may obliterate and the bladder shrink, or the contents lose their infectiousness, and thus eventually complete latency may prevail, wherein the stones by a sort of incapsulation are made innocuous. How often this occurs is beyond our present computation. However, it serves to indicate a tendency of cholithiasis to a natural healing. In this connection it should be recalled that stones in the gall-bladder tend to the development of carcinoma. Of gall-stone patients who came to the clinic of Kehr, all of them late cases, about 10 per cent. suffered with carcinoma. Riedel in 1,000 such cases found carcinoma of the gall-bladder in 8.2 per cent. Kehr computes the percentage of cancer in all cases of cholelithiasis as 1 to 2 per cent.

The question how the stone gains access to the common duct is answered that the muscular contractions of the gall-bladder,

without the patient observing it much, suffice to advance it into the choledochus, and no doubt the accumulated inflammatory exudate in the gall-bladder is helpful in effecting this. It is rare that the occlusion of the choledochus occurs without preliminary cholecystitis. A cholecystitis, even though of mild degree, is practically always present. A stone in the common duct is the occasion for many micro-organisms to enter, and a choledochitis follows. This is obviated when the papilla remains patent and rapidly passes the stone. Here, as in the gall-bladder, the same changes of a serous, or suppurative, putrid or diphtheritic, necrotic or gangrenous character take place. The mucosa, muscularis and serosa show the same changes as described in the gall-bladder. The choledochitis extinguishes at once when the stone passes through the papilla, or when the secretion is enabled to pass by the stone into the bowel. There will then follow a complete latency even though the stone is retained in the common duct. If the stone lies behind the duodenum, just in front of the papilla, a pressure necrosis may establish a choledocho-duodenal fistula, and thus, even after years of occlusion there may yet be established a spontaneous complete cure. If the stone, however, lies in the supraduodenal part of the choledochus, this chance of natural healing is minimized and practically alone the knife of the surgeon can bring relief. The pancreas becomes involved in 33 per cent. of all cases of cholecystitis. Acute and chronic interstitial pancreatitis, pancreatic necrosis, and abscess are not rare concomitants. Other complications can be mentioned here in name only. They are: Pylephlebitis, abscess of the liver, subphrenic abscess, endocarditis, pleuropyesis, nephritis and meningitis.

The immediate cause of gall-stone colic is commonly not easily found. Trauma has been directly associated with its occurrence. The mechanical irritation from the stones plays an unimportant part. Practically all manifestations of cholelithiasis are dependent upon inflammation and infection. Gall colic in the vast majority of cases is owing to a more or less severe inflammation of the gall-bladder.

The latent stage, as the name would indicate, is attended with little or no inconvenience or suffering; it is indifferent whether the stones be large and few, or single, or small and numbering a

thousand. Commonly speaking, the large stones are less mischievous, chiefly because they can not occlude the cystic duct. The stones per se cause little suffering; the swelling of the mucosa of the gall-bladder and cystic duct, and the retained and the altered, inflamed bile cause the suffering. The degree of suffering is dependent upon the virulence and numbers of the infectious germ. Mild cholecystitis flares up like a straw-fire and dies down equally fast. Icterus and liver swelling are not present. The pyriform tumor of the tender gall-bladder may disappear while it is being palpated. The general condition of the patient is hardly affected.

By contrast, the suppurative and gangrenous form creates formidable symptoms. High fever, severe pain, vomiting and anorexia, constipation, diarrhoea, ileus occur. The gall-bladder swells to the size of a tumor, and ofttimes unexpectedly early perforative peritonitis supervenes. If the gall-stones are expelled from the gall-bladder, there develops a general disease; icterus, chills and fever occur, which not infrequently have been mistaken for malaria. Jaundice in cholecystitis is rarely present; when it appears it either indicates an extension of the disease to the common duct, commonly an obstruction of this organ, or is owing to a concomitant affection of the liver.

The stomach cramps, neuralgia of the stomach, acute gastritis, in a large per cent. of cases, are owing to gall-stones and cholecystitis. Oftenest they are serous inflammations of the gall-bladder. The sudden occlusion of the cystic duct prevents extension to the common duct, and thus also is prevented the occurrence of icterus. Swelling of the liver is variably present in cholecystitis; probably it is rare, except where common duct or hepatic inflammation coexist. Pain in cholecystitis is very variable. Commonly it is referred to the epigastrium, more to the right side. It may extend along the thoracic border on the right side to the back; up to the shoulder, and in cases of great cystic swelling down to the region of the appendix. Cases of this latter kind have repeatedly been referred to the writer for operation with the diagnosis of appendicitis. At times pain is felt in the mamma or the oesophagus. The latter has frequently suggested ulcer of the cardiac end of the stomach. The pain may be sharp, lancinating, boring or cramp-like, varying with the virulence of the inflammation or the structures involved.

Most modern writers speak rather scoffingly of the idea of stones migrating. The small calibre of the cystic duct is pointed out as indicating the little probability, i. e., the impossibility, of such occurrence. To the writer there can be no doubt, notwithstanding such argument, that there are cases unmistakably warranting the conclusion that even large stones, much greater in diameter than the lumen of the cystic duct, can and do pass on into the common duct, and beyond, into the duodenum. Every practitioner of any experience has observed cases where a period of severe typical colic was followed by the finding of a grist of stones in the stools. These cases commonly are not accompanied with fever. The writer has in mind a number of such cases, at a time when he methodically gave podophyllin for the permanent relief of gall-stones, and with colic and without evidence of fever finally stones were produced in the stools. This view, as stated, is at variance with modern teaching, namely, that colic is owing solely to infectious inflammation of the gall-bladder. On the other hand, Riedel's contention for foreign body inflammation, in which he stands almost isolated, certainly has foundation in actual bedside observation. The writer would bridge over this chasm of different views by calling attention to the analogy between the uterus or the urinary bladder and the gall-bladder. The former organs have a mucosa, a muscularis and a serosa, not unlike the gall-bladder. They can extrude from their interior bodies contained within them; why not so the gall-bladder? The analogy is obvious if we consider that at times of functional activity, say of the uterus at full term, or any previous period of pregnancy, the parts become suddenly the seat of diffuse oedema, its mouth opens widely the while the muscularis is active. May we not assume a similar, if you will, "physiologic" activity of the gall-bladder when there is need and stimulus given to expel the contained stones? Thus we can plausibly explain the occurrence of gall-stone colic, attended with increase of size of the gall-bladder, tenderness and finally sudden subsidence of all the symptoms, when once the stone has passed beyond its confines and the passageway is no longer obstructed. This, too, would go a great way to explain the presence of a stone found low down in the cystic duct, where, the vis a tergo failing, i. e., dystocia follows, eventually the stone becomes stuck and is released during operation by a "forceps" or by "Duehrssen" incisions.

Formerly the accompaniment of fever with gall-stone colic was interpreted as a reflex fever; today it should be acknowledged as the fever of infection. This invariably indicates a serious condition. Different grades, such as serous, suppurative and gangrenous will indicate themselves, each according to its kind, much as in appendicitis, where a differential diagnosis is being attempted and is nowadays quite feasible.

It can not be within the scope of this paper to deal with this interesting chapter at greater length. It must suffice here to say that symptoms indicating gravity must be looked for, and where found should be acted upon decisively. Alertness to the existence of cholecystitis, with or without stones, will make its detection more common.

The immediate extreme gravity of some such cases, and the serious prognostic significance of others, like in appendicitis of similar character, indicate calling in a surgical consultant.

Surgery of the gall-bladder these days is comparatively as safe and as life-saving as the surgery of the appendix. There, as here, much is gained when surgery is done at the quiescent stage. Surgery of the gall-bladder at a time when the systemic forces are foundered with grave sepsis, when a diffuse peritonitis is imminent, or when intricate biliary, hepatic and other organic involvement exist, will avail little or none. Commonly speaking, an inflammatory, i. e., febrile cholecystitis, or gall colic, should be regarded as decidedly serious.

It is of interest to note the statistics of a surgeon who is equally eminent for his skill in gall-bladder surgery as for his scientific and humane attitude. Quite away from the surgeons who operate by the simple diagnosis of a disease, not by the special indications found variously in different cases, Kehr will have specific indications before operating. Thus he reports on 3,000 gall-stone sick brought to him with the expectancy of an operation. He has found it necessary to operate only in 1,140 cases, i. e., about 38 per cent.

It is impossible here to enter specifically upon the medicinal or surgical treatment of these cases. Some physicians refute all the many specific remedies given for cholecystitis. Kehr, Ewald and others discredit all proprietary medicines as being profitable only to the manufacturer, and often fatal to the patient by occasioning dis-

astrous delay for surgical intervention. Others advocate surgery for every case of cholelithiasis. Rest in bed, no feeding by mouth, heat over the part (Bier principle) and such anodyne and antiseptic treatment as are found valuable in the treatment of septic fevers in other organs of the body, without doubt avail much in palliating, curing or tiding the patient over to a quiescent stage.

In conclusion the writer assumes to say that cholecystitis is an affection much more common than now recognized; that its frequency stands little back of the frequency of appendicitis; that it is often of ominous significance, tending fatally if not met properly; that a differential diagnosis with regard to its character and tendency must be timely sought for; that its medical treatment in suitable cases may achieve a cure; often only a quiescence is achieved and in itself is a condition most favorable for surgical intervention; that procrastination in suppurative cases courts a fatal issue, where surgery at an early stage might give relief; that surgery of the gall-bladder and deeper biliary tracts has developed remedy for relief excelled in none of its departments; and that the co-operation of internist and surgeon in cases of cholecystitis should be regarded the logical sequence.

DISCUSSION.

Dr. T. C. Kennedy, of Shelbyville: I have been very much interested in Dr. Pantzer's paper. These diseases are essentially surgical diseases, but the question arises: What are you going to do with the vast number of cases that refuse operation? Dr. Pantzer mentions olive oil. I lay emphasis on the succinate of soda. It is anti-spasmodic and has the power to overcome the infection of the gall-bladder. The great trouble that comes from gall-stones is due to the cholecystitis, and we know that in gastritis and appendicitis and inflammatory affections of the intestinal tract we can get relief, and I believe with the succinate of soda we can get some relief, especially, as I say, in the cases that refuse operation. The succinate of soda I use in five-grain doses about every two or three hours. It has been proven that it has some power of dissolving gall-stones outside of the gall-bladder and renders the bile less viscid.

I like the treatment at the mineral springs. Kehr, the great German authority, says he would send all cases after operation to Carlsbad. We have springs here that are equally good. The alkaline-saline group of springs certainly have the power of liquefying the bile and acting as a detergent, and I have seen some cases where they have had a good effect, and if we were permitted to send our cases after operation to these cures we would effect a more speedy and perfect recovery.

Another important matter is the making of a differential diagnosis of cases in the upper abdominal zone, where it is frequently impossible, and if we can not make a complete differential diagnosis I think it is well to make an exploratory incision to find the exact condition. I had a case of this kind about a week ago in which we thought it was gall-stones, but proved to be malignant, and of course with no chance of any benefit to the patient. But these cases stand the incision well and we usually do no harm, for the patient is bound to die at any rate, and where they last awhile and they get no benefit from medicine even though we can not make a differential diagnosis it is not well to wait. Very frequently we will find a condition from which we can get a great deal of relief.

Dr. T. B. Eastman, of Indianapolis: My friend Kennedy said the succinate of soda dissolves gall-stones. I wonder how he knows. I have taken solutions of succinate of soda in all shapes and forms and put all shapes and chemical forms of gall-stones in the solution and they won't dissolve for me. It is not known what change the succinate of soda makes in the blood that makes it dissolve gall-stones. Nobody ever saw it done and I do not think anybody ever will see it done.

In regard to olive oil, I suppose the theory of the users is that the olive-oil gets into the gall-bladder and ducts and greases the ducts and they slide into the intestines. What are the facts? The only thing that olive oil does is to increase the flow of bile. That it does this the following case will show: A year or so ago a man came to see me with gall-bladder trouble, with a gall-bladder as big as my fist, either stones or inflammation, I did not know at the time which. I advised operation, as I do in every case of gall-stones or cholecystitis, but it was refused. About three days later he had a sudden pain in the region of the gall-bladder, and the

bladder bursted from the accumulation of bile in the bladder. His belly was full of bile and gall-stones. Now what do these things do? They simply allay the inflammation in the gall-bladder and make it more tolerant of these stones, and they get only the symptomatic cure. Of course we have seen stones passed in the feces, but I have seen some which on examination proved to be nothing but lumps of phosphate of magnesia given to move the bowels. It is well to consider this. As a matter of fact I do not believe in any medicinal treatment which trusts to Providence to steer these stones down the right track. They are as apt to break into the peritoneal cavity as into the intestines. Every case ought to be operated, and every case of cholecystitis ought to be drained.

Dr. H. O. Pantzer, of Indianapolis: Dr. Kennedy speaks of the treatment with medicines. I believe at this time the authorities on both sides of the water are agreed that we have no solvent for gall-stones. Ewald, one of the foremost of internists, and Kehr, the renowned gall-bladder surgeon, agree upon that proposition. Kehr sends patients to Carlsbad, as Dr. Kennedy says. But Kehr makes another remark, namely, that patients go to Carlsbad who properly should not go there, from the fact that these patients in large numbers come to the surgeon afterwards, when they have run a course that is much more severe than had they gone to the surgeon first.

As to the possibility of gall-stones passing from the gall-bladder through the narrow cystic duct, I will draw upon the pregnant uterus for analogy. We have the same anatomical structures as we have in the uterus, namely, mucosa, muscularis and peritoneum. In the former case we have suddenly supervening a serious infiltration of the part, an activity of the muscularis, an opening of the cervix and eventually the expulsion of the ovum. Why is it not fair to assume that the gall-bladder can likewise expel its contents. I think the analogy goes a great way to make it seem probable that gall-stones do migrate. Every practitioner knows cases where gall-stones of much larger size than the duct are passed by the natural way.

The indications for operation are variously formulated. There are those who would say whenever you have gall-stones, operate.

There are others at the other extreme who would invariably hold to internal remedies to the last. Now, in view of the many disastrous cases which at an early stage were operable and curable, it is certainly advisable to operate in somes cases. However, if the two million cases of cholelithiasis existing among the sixty millions of people in the German Empire are all to be operated because one hundred thousand come to trouble, the proposition that confronts us is wrongly met. It means that the one million nine hundred thousand who have gall-stones which give rise to no trouble, be subjected to the uncertainties of anesthesia, wound infection, post operative adhesions and other sequelae. The morbidity and mortality following operation in these cases is not inconsiderable, especially when operations are being done by all kinds of operators, good, bad and indifferent. Our mortality lists as quoted, it must be remembered, are from the statistics of the most expert and frequent operators. Fundamental principles should apply here as elsewhere in surgery. Scientific and humane interests alike demand a discriminating diagnosis in behalf of the indications for treatment in each case. Commonly speaking, a gall-bladder that has become infected and inflamed must be regarded with gravity. By the present light of our knowledge about these diseases, such a case must be considered with regard to a surgical recourse. In conclusion I wish to thank the meeting for the courteous attention given my paper.

USE AND EFFECTS OF TOBACCO.

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All nations, as far as is known, use some kind of nervous excitant. Alcohol in some of its various forms, opium and its derivatives, cocaine, tea, coffee, and tobacco, constitute the principal agents used for this purpose. The science of entomology teaches us that insects exist in this country, too numerous to describe separately in this paper, but upon the whole, are classed as harmful and destructive, harmless and beneficial. With a proper knowledge and understanding, we must concede this to be correct—likewise, with narcotics and stimulants, we have the harmless, beneficial, and not only useless, but destructive, and one of this class is tobacco.

Most all of the fore-named agents are classed among our most potent medicines, with the exception of tobacco, which is of doubtful utility. As the use of any one of these agents will furnish sufficient material to tire the patience of this medical association, I shall confine this paper, mostly, to one of the above-named poisons—tobacco.

It is quite probable that tobacco was not known to the civilized world before Columbus discovered America; hence the astonishment of Columbus and his crew, at seeing smoke issuing from the mouths and nostrils of the natives, as they smoked tobacco in long reeds.

Indications show that in America tobacco was used as long ago as the indefinite far-away mound builder's period, as is evidenced by stone pipes of that era, which can be seen in almost every antiquarian cabinet in the country. I remember well one or two of such pipes having been recovered from a mound situated on my grandfather's farm, and one of those pipes was kept by my father as a relic, as long as I was a member of the family circle. It is possible that while these ancient mound builders, with the use of tobacco, were piling up those comparatively insignificant monuments of earth, the Egyptians, without tobacco, were rearing

those imperishable pyramids, which are the wonders of today, the problem of the world. Without tobacco, too, those huge stones seventy-two feet long, seventeen feet wide and thirteen feet thick, were moved nearly a mile from the quarry and elevated into a wall thirteen feet from the ground, a triumph of art which all science of the present day, aided by tobacco and alcohol, has not accomplished.

Consider the fact that the United States alone produces nearly fifteen thousand million pounds of tobacco annually, and consumes nine hundred million dollars' worth annually, and at the present time the amount of tobacco employed as a therapeutic agency is so insignificant that it is not worthy of a place in therapeutics, and should have been excommunicated long since. We are aware that most users of tobacco claim it is almost a specific for their particular ailment, but it must not be forgotten that the habitual smokers and chewers are interested witnesses, and can not tell the truth on this particular subject. We know this from personal experience. We have been all along the line and know every inch of the road. I have not acquainted myself only with rods and furlongs, but every inch of the way. I know every crook, turn and angle of the way of a tobacco fiend. I was not naturally a tobacco user; neither is any one else. I was decoyed into chewing when a small boy, about ten years old, and smoking when about fifteen years old, of which I will give in further detail later on.

To intelligent people we will put the following interrogatories: Does the use of tobacco improve the general appearance of the user? Does it improve his health, or increase his physical manhood? Does it brighten his intellect for the duties of the day, or compose him to calmer sleep at night? Does it add one grain to his sands of life? In short, does its habitual use confer a single favor or comfort, on any man in health, and otherwise favorably situated? We say no, only as it serves to satisfy an acquired, pernicious and depraved appetite, and that with many disadvantages. We will give some of the constitutional effects of tobacco, which can be sustained by the highest authority in the world. Trembling, giddiness, sickness, vomiting, gastragia, dyspepsia, vitiated taste, loose bowels, diseased liver, congestion of the brain, pain in the head, apoplexy, paralysis, loss of memory,

amaurosis, deafness, nervousness, impotence, cowardice, temporary blindness, mania, paleness and sallowness of complexion, enfeebled voluntary muscles, sleeplessness, palpitation of heart with feeling of suffocation, clouded mental faculties, irritable temper, unstability of purpose, fits of despondency, emaciation, harshness of voice and general anemia--and then some. To the above list may be added indolence, slovenliness, and inexcusable purposelessness. Of course it would be a waste of time and labor to refer to proof of all the above charges against the user of tobacco, but I doubt not that there are those present, old sinners such as I have been myself, whose personal experience or observation would sustain every count in the above indictment.

Leaving the question of what the essential elements of life forces are, it is safe to assume they are capable of sustaining only a given amount of resistance until they yield to decay and death. The effect of tobacco on the young best illustrates the foregoing statements. If any of you know a dwarfy old man only eighteen years of age, who is no larger than a ten-year-old boy, though he bears the appearance of one three score and ten, and who walks your streets an indolent, purposeless and unprofitable life, that boy uses tobacco, or quite likely his father was a drunkard, and chewed and smoked both when sober, and that boy is in training for the state prison, but for want of enterprise may never attain to higher consideration of the state than a home in the insane asylum.

Most of the old tobacco sinners doubtless know from experience that memory is impaired by the use of the drug. If we propose to perform any solid mental labor, we do not call in the aid of tobacco, which is only calculated to assist the fanciful dreams. Milton, the poet and author of "Paradise Lost," saturated his loftiest conceptions with tobacco smoke, but Sir Isaac Newton, who brought order out of confusion of the astronomy of his day, could not afford to build to himself a new necessity in the shape of tobacco. The island of Cuba, which has produced, and Spain, which consumes more tobacco than any other countries in proportion to their population, have been sorrowful examples of mental and physical indolence. They were for years engaged in war with each other, which only proves the degeneracy of a race once distinguished for energy and enterprise, the home of Queen Isabella and Christopher Columbus.

I can conceive of no circumstances in which we would advise the use of tobacco, by persons in health, except those whose sole occupation is to kill time. The old man bereft of friends, who is deaf and blind, and an inmate of some one of our county asylums, might use tobacco, if it were not for the engendering of pollution, to the disgust of other inmates more refined, who of necessity occupy such places of charity, or one who with all his faculties unimpaired, is condemned to prison life, or is hopelessly banished or cast away on some desolate island. These and such as these only, perhaps, might possibly indulge in the use of tobacco, for its obliterating effect, but with a degree of protest, as this paragraph indicates. We might as well adopt the Mexican habit of using arsenious acid, until we could take a drachm at a time with impunity, and then insist that it is essential to our wellbeing.

As to the mode of using the obnoxious weed, tobacco, it is hardly necessary to take up much space in this paper, as the poisonous effect upon the nervous system, which amounts to the same, can be introduced in various ways, by chewing, smoking, or snuffing. We have known a few tobacco fiends, in fact some at this time, who swallow the extra flow of saliva, called amber by tobacco chewers. I do not know that we have any authority for such a word as amber, only as established among tobacco chewers. This is where I caught on. I assure you it was not by swallowing the juice, purposely. I will say, briefly, all the amber that got down my throat was by way of accident, which often occurs with tobacco chewers. Sometimes it is drawn back into the trachea, then tumult and commotion take place.

The habit of swallowing the tobacco and amber is slowly acquired, on the same system or procedure as the fable of Milo and his bull calf. Milo commenced lifting the calf when quite small, as often as three times a day, and kept it up until he could lift and carry him when he was quite a grown bull, and I will venture to say that Milo was not a user of tobacco. Those individuals that can and do inhale the smoke of tobacco deeply into the lungs, and retain it almost indefinitely, with closed mouth, and exhale it through the air passages of the nose, are already entrapped, and with all other fiends, such as opium, alcohol, cocaine, and all other victims of habit are to be pitied, as but few ever get their freedom. We find such subjects with depraved

nerve centers, going about like walking skeletons, with cadaverous appearance, and look as though they have about as much blood in their bodies as we would find in a cured, smoked and dried herring, or what is generally known as a blind robin. The tobacco fiends are so saturated with this nicotine poison, that on examination of the heart's action we find cardiac murmurs, either valvular, mitral, cystalic, or aortic, and almost all that are sixty-five years old have arteriosclerosis. We find this to be the case with our old war veterans, who are old tobacco veterans as well, and is it any wonder, as it is positively known that the active principle (nicotine), which it contains in large quantity, is next to prussic acid, which is the most rapidly fatal poison known.

Like alcohol, tobacco is prepared in many ways as an inducement to decoy young men and boys, and older men as well. No one knows so well of the preparations as the individual who has been initiated, and taken most of the degrees as a tobacco user. I will name a few of the preparations for chewing, commencing with the old six twist, as I knew of sixty years ago, which sold without weighing, six twists for a pound, which was known among tobacco users as dog leg, horse leg, and other low, offensive, unrefined names, all in keeping with the truck. Next came the Cavendish, the Navy, Black Strap, Shoe String, Pigtail, Honey Dew, Golden Thread, Star, and doubtless a hundred other kinds, but I must not forget one other kind, of much importance, known as Natural Leaf, or Hen Roost, as I remember well of seeing much of it packed or hanging in old sheds, stables or barns, where chickens roosted over it. And for smoking and chewing is the Polar Bear, Bull Durham, and hundreds of other kinds, some of it gold-tipped and gilt-edged. When it comes to cigars and cigarettes, there are thousands of different brands, some of them decorated with all the national colors, red, white and blue, and advertised in a picturesque manner with all our statesmen, or people of any great notoriety, as showing favoritism to a certain brand of chewing and smoking tobacco. This is all done for the purpose to decoy, and get the young and old into the trap, in the interest of the vendor.

Quite recently the members of our General Assembly of the State of Indiana legislated against the manufacture and sale of cigarettes alone, in this state, upon the grounds that the wrap-

pers were contaminated with arsenic, and the fillers with a certain per cent. of opium, or some narcotic poison. This act of our legislature, to a degree, met with our approval, but when we take into consideration the large per cent. of nicotine contained in tobacco is next to the most rapid and deadly poison known of today, we are inclined to sympathize with the party that swallowed the bull calf, then choked to death on the tail.

What a sad leveler is tobacco. If any one doubts this assertion, let him take a seat for one day in a smoking car on any of our most traveled railroads, and he will find the highest and the lowest on a common level in a smoking car, engaged with each other in raising a cloud of smoke from the best havanas, and from the worst one-cent cigars, manufactured from the rottenest and vilest hen roost tobacco, which we have spoken of in this paper. No old tobacco consumer ever advises his son to imitate his father's example.

Is it not time that doctors take higher grounds on this subject? It seems to us that no class of people banded together, as doctors, are so well prepared to show up the dread realities of all confirmed and acquired harmful vices, or pernicious habits. We have high authority for the statement that all vices are kin and on visiting terms with each other, which accounts for the fact that the tobacco user glides so easily into the intemperate use of intoxicating beverages, with all its train of blighting consequences. Hence tea, coffee, tobacco, opium, and alcohol may meet in the same frail tenement, and all fail in time to yield the wonted glow of pleasure to him who is the unfortunate victim. There are moral and economical considerations of this question, which will not be introduced, but they are so potent that he who does not recognize them uses his understanding to little purpose.

And we again say we know of no reason why doctors do not exert a greater influence in favor of any means which go to make up the sum total of human progress of the age, if indeed, we are progressing. Physicians are called into close proximity with all professional life, from the highest to the lowest order, consequently, in the aggregate, have greater opportunities to delve into every condition or vicissitude of life, therefore can do much, as pertains to a betterment of health; but we must remove the beam from our own eye first; if not, we lose prestige.

I promised in the beginning of this paper to give my practical self-experience in the use of one of the most useless, senseless, uncalled for, dirty, filthy, pernicious and poisonous acquired habits, that humanity ever indulged in. I commenced chewing tobacco when about 12 years of age. A neighbor boy, a chum, about my own age, would steal the damnable stuff from his father and divide with me. One day I asked my chum how he managed to keep down suspicion of his father. Well, he said the old man accused him of stealing his tobacco, but he lied out of it; said he made the old man believe the mice were eating it. Another proof that all users of narcotics and stimulants are untruthful on that subject. Well, it took me about two years to acquire the habit, but finally I got there, after being made so sick a number of times on the cursed poison, yes, so sick that I vomited and purged simultaneously, and was so void of snap and twist that I was blind and could not bat an eye, and will say further, if there is anything short of the cross of crucifixion upon Mount Calvary's hillside that will cause the sweating of blood, it is sickness from the effect of tobacco poisoning. It required two years to take on the habit of tobacco, and perhaps longer to get rid of it.

I chewed and smoked about fifty years. After using it twenty years I realized some cardiac disturbance; also found as I grew older I became more filthy with it. I will say I never spat on the floor or carpet, or stove, as I have seen others do, but was becoming more careless with its use. Very few tobacco users ever let loose of it—the same way with opiates.

I have in my time been into both. I was confined to bed two years and four months; was a great sufferer from ulceration of bowels, and used opium for temporary relief, but with a strenuous effort I got loose from that, which required sand to accomplish the work. All acquired habits are hard to get rid of. But when we think properly that mind and application makes the man, and what we accomplish must be backed up by will power, as intelligent creatures, we should not be slow to act in getting rid of what we know to be a detriment to our health and well-being.

I will close by taking the broad ground that the use of tobacco has never been any benefit to any individual, but to some a physical detriment and mental damnation, from start to finish. Oh!

How proud I am today, to know that I am a free man from narcotics and stimulants. Especially free from the habit of using tobacco.

DISCUSSION.

C. R. Schaefer, of Indianapolis: This paper was very interesting, especially on account of the recent legislation that we have had in this state, but I do not know how reliable the things stated in this paper are, for I have never had the experiences of Dr. Mauk, for, according to his own statement, he has been a user of tobacco for half a century. I can not say as to whether the effect produced on him was the effect of the old "six twister" or the "hen roost" brand.

The effect of tobacco undoubtedly is harmful, if ever used. One can get along without tobacco as one can get along without other stimulants or narcotics. But it seems to me that human nature must have some quietus at times; some have been predisposed to one rut, and others unable to get out of another, and some can pull along without anything. A great deal of tobacco is used in this day and age. Tobacco, if properly used, if used in moderation, is not so harmful as some may think it to be. Of course this depends on the amount of resistance of the individual to a great extent, but it seems not to do any harm in a great many cases. There is one question, and that is all important: "What does the moderate use imply?" That is an individual affair. Tobacco contains a poison that is deadly. It takes only a grain of nicotine to kill a man, and the ordinary cigar contains enough to kill two persons, or would kill that many persons if the nicotine that they contain could get into the circulation, but a great deal of it is destroyed; it is destroyed during the sweating, and during the curing process and by smoking, but still a good deal remains in it. It would kill if all of the nicotine could get into the blood and act on the system.

Why is nicotine so deadly? Nicotine is a depressor of the sensory nerves and of the sensory nervous system, but it is much more a depressor of the sympathetic nervous system. I do not know of the effects of nicotine through experience, however.

Dr. Earp, of Indianapolis: I do not desire to throw boquets at the reader of this paper, but it certainly was a very, very good

one, and we need papers like this to call our attention to the detrimental progress of this habit. I believe that if all of the things which have been said are true, and that tobacco is really so poisonous, that it, too, should be included in the law which was recently enacted in regard to the throwing of patent medicines, etc., on our doorsteps. There are no statistics which show that longevity has been lessened by the use of tobacco, and furthermore, it is shown that people live longer than they did ten years ago.

I think there is no doubt but that many of our cases of cardiac trouble may be due to tobacco; it may be the cause of a number of organic diseases. You will notice that if a man uses a large amount of tobacco and smokes just a short time before eating that there is a lessening of the appetite, and also a lessening of the power of digestion, for the digestive juices are less in quantity and poorer in quality, and therefore assimilation is lowered by the use of tobacco. I think close attention should be called to this point.

Dr. Case: I have one fact that I would like to tell about which is contrary to law. I know of a man who has the syphilis, and he is a cigarmaker by trade. Now, the rules in regard to cigarmaking are rather strict, and this man had them pasted on the walls of his factory. The rule says that they must use the sponge in sticking the cigar after it is filled. I have stood by this man several times watching him make the cigars, and only once in a great while would he use the sponge, but he generally used his lips to wet it, or the saliva, rather.

Dr. Work, of Elkhart: My experience is not as extensive as that of the man who wrote the paper, but it began earlier. I commenced when I was about six years old, commenced about two o'clock in the afternoon and quit before sundown. I have not used it since. I had just enough sense left to know that anything that could make a person as sick as I was after using it was not fit to be fooled with.

Dr. Bruner, of Greenfield: For nearly nine years I was on the pension board and I began to recognize what tobacco was doing for the soldiers. I realized that there was a tobacco heart, not an organic condition but a sympathetic condition, and in examin-

ing soldiers for pensions I would find that condition. You could tell it by putting your finger on their pulse or your ear to their heart; it was not organic nor rheumatic, but a tobacco heart, and we found it very frequently. It would beat intermittently and in an irregular manner; walking up a hill or something of the sort would produce this condition. Then it must have its effects on the other tissues of the body. I think there is no question but that life is shortened by its use, even by those who use tobacco in what they call moderation.

I know of several cases where people have had to stop this habit on account of their eyes. Surely, no one can stand with all of these facts before them and say that the tobacco habit is not injurious.

THE PHYSICIAN OF TODAY.

BY NICHOLAS A. KREMER, M. D., OF MADISON, IND.

Leaving aside all mooted questions, I shall discuss the physician of today in his relations to the medical schools, to the profession itself and to the general public.

The last quarter of a century has seen the medical profession make some wonderful strides in scientific methods. Probably no other profession can boast of such progress. We find the physician of today in the foremost ranks of scientific investigators. He has discovered the cause of nearly every disease. And knowing the cause he has been able, not only to establish a rational treatment for each, but also, in most cases, he has found a means to prevent them. The results are indeed gratifying. Some diseases have almost been exterminated, while the horrors of all of them have been greatly mitigated. There are, it is true, still some diseases which baffle the physician's skill. But let us not be discouraged. In the light of the present progress we have every reason to believe and hope that mastery over them is not far distant.

The physician of today owes his success largely to the modern schools of medicine, with their staff of able professors, their well-equipped laboratories and their clinics, where the most skilful of surgeons demonstrate before the class. How vastly different from the schools of former days. Then it was all theory and no practice. I recently had the pleasure of meeting one of our venerable old physicians. His professional canoe had been launched some fifty-four years ago into humanity's turbid stream, upon which the bark of every general practitioner must float. He was in a happy mood, and dilated, with much humor, on the conditions of former days, when, with the eagerness of youthful manhood, he sat at those fountain-springs of medical wisdom to drink deeply of the draughts of medical knowledge, whereby he was to be fitted for his life's battle with disease, that dread enemy of the human frame. Oh, he said, there was an abundance of theory in

those days, but precious little of practice. Didactic lectures without end, deeply learned, it is true, and highly appreciated, at least by those who were fortunate enough to thoroughly understand them. But, as for clinical experience, oh, the Lord bless you! that had to be obtained in after life at the bedside of your own patients. Why, he said, the young man, fresh from the medical schools of those days, who hung out his shingle, which announced to the world his ability, or rather, I should perhaps say, his willingness to administer to the sick and afflicted, was, practically speaking, nothing more nor less than an educated donkey. Well, we shall be indulgent with the old gentleman. He meant no opprobrium. He belonged to that class himself, as he jokingly remarked.

With the exception of hysteria, chorea, epilepsy and perhaps a few others, little was known of nervous diseases. They were lost sight of in diagnosis as well as in treatment. The germ origin of disease had not even been dreamed of.

It is quite different now. Give the physician of today, even the newly-hatched one, but a fair chance and intelligent co-operation on the part of the people, and, with the modern, scientific methods of treatment, with which he was familiarized practically as well as theoretically, he ought soon to win the good-will and approbation of the public. And while his success may not be phenomenal, it ought to be marked and steady. And wherever the physician of today fails in this, the blame seems to lie with himself. But yet, success professionally does not always mean success financially. As a rule the physician of today does not seem to be a good money-maker. In this respect his progress has been rather slow. At best his fees are comparatively small. The lawyers, and quite frequently the ministers, easily surpass him in this respect.

Various reasons might be adduced why the physician is not more successful financially. A very common reason, which I submit for your consideration, is that there are too many physicians as well as too many medical colleges. Of these many have teachers who are incompetent in their respective branches. The result is the graduation of a vast number of students, some of whom, while they might be proficient enough in theory, are wofully deficient in practical training. The overlarge number of medical

schools may be accounted for by the ardent desire of so many practitioners to become professors. Too many doctors affiliate themselves with medical colleges merely for the sake of the honor which a professorship entails, unmindful of the fact that a position, no matter how exalted, will reflect honor only upon him who proves himself worthy of it. One may meet with professors in medical schools who are willing to work without any other emolument but that of the honor of holding a professor's chair and of enjoying the prestige which this position carries with it in a community.

Personally, I have come in contact with some such would-be professors, who pretended to have spent six weeks or two months of their vacation in a far eastern post-graduate school or in a university of Europe. But later on their conversation revealed the fact that they had spent one week of this time at a popular summer resort, then some days in the mountains, a few more days in Washington and the balance of the time at the seashore and at various other places. What a wonderful amount of medical knowledge they must have imbibed at such great seats of learning! And how fortunate the student who is to receive the benefit of such scientific post-graduate courses. While the physician ought to do all in his power to encourage good schools of medicine, yet he owes it to his own profession as well as humanity, to discountenance all such shyster institutions that grind out incompetent nincompoops at so much per head.

Another obstacle to the financial success of the physician are the hundreds of men who are practicing medicine not only without license, but even without adequate education. I refer to druggists, peddlers, merchants and hundreds of fakirs who are making a business of advertising, recommending and vending the thousand and one nostrums or patent medicines of today. Practicing medicine, as I understand it, is nothing more than diagnosing disease from the symptoms found, and then applying the proper remedies. Now the physician can not legitimately do this without a license, at least not in our state. But before issuing the license the state properly and justly demands satisfactory proof, either by diploma from some recognized school of medicine, or by examination, of the applicant's knowledge and qualification to practice medicine. Now the fakirs and the others

spoken of above are doing practically the same thing without being amenable to the law. They diagnose, or at least they pretend to do so, and then recommend and sell the remedy, and this, in almost every case, without having the least knowledge of the science of medicine. This is an injustice to the regularly licensed physician, and he ought to bring all the influence at his command to bear upon the "powers that be" to have this evil abated by proper legislation.

Some reputable physicians persist in compounding their own medicines. When asked why they encumber themselves with medicine cases, and why they make their offices unsightly by stocking them with drugs of all sorts, instead of adopting the more genteel and much easier way of writing prescriptions, they will tell you that they are forced to do it in self-defense. Experience has taught them that not infrequently unscrupulous pharmacists abuse their confidence by using their prescriptions for every Tom, Dick and Harry who happens to have the same or a similar trouble as that for which the prescription was originally given. If all reputable physicians would unite in resenting such disreputable practice, the nuisance would soon be abated.

And while speaking of the unscrupulous pharmacist, let me draw your attention to another abuse, which is little short of criminal, and that is the practice of substituting drugs when compounding prescriptions. This can not be too severely condemned by every physician. The evil seems widespread. In an attempt to learn its extent, the Illinois Board of Pharmacy sent out 139 decoy prescriptions to druggists in Chicago. An analysis of the compounded medicines showed the following astounding results: In 23 cases not even a trace of the drug called for could be found. In 66 cases drugs 80 per cent. impure were used. Ten cases showed 20 per cent. impurity of drugs, and only in 31 cases were the drugs found to be absolutely pure and compounded according to prescription. Well, you might say, that was in Chicago. But if such a state of criminal abuse exists in Chicago, we can reasonably expect to find it proportionately in other cities and towns of the land. And the medical profession ought to be a solid unit in demanding, in season and out of season, a universal law which would spell stringent supervision in a matter of such grave importance.

In his dealings with his brother practitioners the physician should always be social, honorably courteous and above all charitable. There ought always to be harmony and good fellowship amongst the physicians living together in the same community. There can be nothing more disgusting to the public than to see such physicians at loggerheads with each other. It is almost incredible to what low, mean, contemptible little tricks some physicians will stoop to undermine the reputation and spoil the practice of some successful physician. And at the bottom of it all there usually lurks that vicious, green-eyed monster, jealousy. Now, such things would not occur if all physicians would strictly adhere to the laws and honorably live up to the principles of medical ethics, as they have been formulated by the American Medical Association.

Another violation of medical ethics which deserves the condemnation of every fair-minded physician, are certain kinds of contract practice which have sprung up of late. I do not refer to the time-honored practice of being house-physician to colleges and other such institutions at an honorable annual salary. Nor do I refer to those physicians who contract with corporations for fees that are conformable to ethics, but I mean the contemptible cut-rate practice (if you will pardon the expression) of those who, regardless of all rules of ethics, will underbid any and every one, or who, even when there is no competition, will contract for fees so ridiculously small as to be a disgrace to the medical profession. I have personal knowledge, for instance, of a case where a physician, who is a member of a certain lodge, agrees for the paltry sum of $3.50 a member per annum, to treat not only the members of the lodge themselves, but even their entire families for any and all sickness that may come up during the year. When the profession goes a-begging like that, it is no wonder that corporations and factories try to dictate the fees which surgeons and physicians ought to receive for attending their employes. I notice with pleasure that various medical journals are combating this censurable phase of medical practice, and that county and state societies are striving to abolish the custom. Every local or county society ought to insist, yes, insist unrelentingly, upon proper adherence, on the part of its members, to the laws and principles taught by the American Medical Association. We should always

bear in mind that the practice of medicine is the business of our life. It is as legitimate as any other. We must live by it as other people live by theirs, and hence we must place it upon a business basis, and, to be successful, we must operate according to business principles. Popularity can easily be acquired at the expense of legitimate fees, but such popularity will neither pay one's bills nor will it furnish one's table.

It would go beyond the scope of this paper, and it would be making too great a demand upon your valuable time to discuss the relation of the physician to the public in general in all its varied phases. Hence I shall touch upon only a few points which might be of interest.

The fundamental principle of this relation is one of justice and right. Whenever a physician locates in any community for the purpose of practicing medicine, he enters into a "quasi-contract" with the people of that community. The people fulfill their part of the contract by paying the various fees demanded for medical service. They entrust their bodily health and even their life to the care of the physician. The physician, on the other hand, is obliged, in virtue of this contract, to use every known means in the care of his patient's health. Hence he is obliged to have the necessary knowledge and skill. Any one attempting to practice medicine without at least the usual or ordinary knowledge of medicine, is not only getting money under false pretenses, but he is a menace to the public weal (excepting, perhaps, the undertakers). He deserves to be placed and to be kept behind the bars, and every reputable physician owes it to the public to have him put there if he can. It is not enough that a physician have a diploma from some medical school, but because, especially in our day, the science of medicine is making steady progress, he is bound in justice to the people to continue his studies and keep abreast of the times. The old fogy that thinks he knows it all, and laughs at the new-fangled notions, as he sees fit to call the modern methods, ought to be relegated to oblivion.

In virtue of this quasi-contract the physician, once he takes a case, obliges himself to give at least reasonable attention to his patient. Hence he must be willing to call at any hour, whether by day or by night, when necessity demands it. I, for one, can not see how a physician who refuses to make night calls can conscientiously continue the practice of medicine.

No honorable physician will run away from contagious disease unless the municipal authorities have made ample provision for the proper care of the afflicted.

In justice to his patients a doctor is bound to use only known and tried remedies, and is not allowed to experiment with doubtful ones. Let the experimenting be done on the lower animals, and when the effects are sufficiently known, there is time enough to use them on human beings. In extreme cases of necessity, where there is question of life and death, there is no wrong in using doubtful remedies, which might prove successful.

Nothing too severe can be said in condemnation of the criminal practice of medicine. To the physician human life ought to be sacred in all of its phases. In the light of present scientific knowledge there can be no doubt that once conception has taken place, human life exists in the embryo. And the unborn child has as much right to existence as any other human being. To my mind any one, be he a physician or not, who directly and intentionally procures abortion, no matter at what stage of gestation, is just as guilty of taking human life as is the dastardly coward who deliberately strikes down or shoots down an innocent child walking the streets. And I can conceive of no conditions, and I know of no circumstances, which could ever justify the direct abortion of a living fetus. Furthermore, I know of no conditions or circumstances which could make allowable craniotomy in the case of a live fetus. You might object that at times it seems the only way of saving the mother. But the child has as much right to life as has the mother. You can not appeal to the law of self-defense on the part of the mother. For self-defense is applicable only in the case of an unjust aggressor. And never can unborn child be looked upon as an unjust aggressor to the life of the mother. But, you might further object, they will both die. Better far that both should die a natural death than that I should kill the one to save the other.

Lest I weary you, I shall touch upon only one more point, and that is patent medicines. Having agreed at least by an implied contract to care for the health of his patient, it becomes the physician's duty to point out to them the fakism connected with all such nostrums and to warn them of the danger of an indiscriminate use of remedies of whose contents nothing definite is known.

If they did but know of the fraud perpetrated by these scheming would-be benefactors of the human race, they would soon be put out of business.

Take, for instance, the Lydia E. Pinkham's vegetable compound fake. Women throughout the land, according to newspaper reports, are still writing to this remarkable woman, telling her of their troubles, and what is still more amusing is, that they are receiving replies from her, when in fact she has been dead some twenty odd years. At least in a beautiful cemetery at Lynn, Mass., a large monument marks the last resting place of one Lydia E. Pinkham, who, God rest her soul, departed this life A. D. 1883. I do wonder how they transmit her mail. Does it go up? Or does it go down? And when the replies come, do they smack strongly of sulphur and brimstone, or do they send forth sweet scents of heavenly incense? The great Barnum, it seems, was right when he said that the American people want to be humbugged.

It is as remarkable as it is amusing to note the kind of people throughout the land who, if newspapers speak truly, are singing the praises of "Peruna," Dr. S. B. Hartman's brand of "booze." There are senators and congressmen, clergymen and professors, scores of women and, would you believe it, even doctors, who all love to tell how well and happy they have been made by Peruna. Well, they might feel just a little better, and no doubt much more happy, if they bought from some reliable firm a little better grade of "spiritus frumenti" than is being used in the concoction of Peruna. No doubt you have heard the story of the doctor who had been called to a family, quite prominent in prohibition circles, where the father had been taken quite seriously ill. After careful examination the doctor diagnosed it a case of delirium tremens beyond human aid. Well, the family came near taking his head off and threatened all kinds of punishment, ready as they were to swear that the husband and father, to their certain knowledge, did not drink. Scores of empty Peruna bottles about the place told the tale. Druggists would do a rushing Peruna business on Sundays, now that the lid is on, if a certain class of people only knew what Peruna really was.

I can hardly dismiss this subject without mentioning Liquozone, which has been so extensively advertised of late. It claims

to be an agent, in which free oxygen and ozone are generated, and is highly recommended for every ill which human flesh is heir to. Dr. D. F. Ragan, health officer of San Francisco, deserves much credit for his investigation of this fake. By analysis he has shown that it contains no free oxygen and ozone, but is a mixture of sulphuric and sulphurous acids, with some traces of formaldehyde and quite an abundance of Chicago water. It might be recommended as a disinfectant for stables, drains, urinals and other such like places, and probably there would be no objection to its external use for barber's itch and other such skin diseases. But that is as far as I would care to go.

The government is at last awake to the danger there lurks in adulterated food-stuffs and drugs, and has passed pure food laws. And we, as physicians, ought, in justice to the public, to use our every effort to have the provisions of these laws carried into effect. God speed the day when every can of food-stuff, as well as every nostrum, must have printed in plain, simple language on its label its exact contents.

DISCUSSION.

Dr. Henry Jameson, of Indianapolis: While as a rule members of the profession and members of a society of this character find it a little bit difficult to listen to papers of this character, I want to compliment the doctor for touching upon quite a number of subjects of importance to the medical profession; that is, as to his duty to himself and to the people, and that carried out conscientiously.

There is one thing in connection with the ethical standpoint of the physician touched upon in Dr. Kremer's paper, and that is so long as the ethical standard of the medical profession is lowered it loses its hold upon the public and gives room for all kinds of quackery of which we complain. The bane of scientific medicine is the ignorance, and the support of the people in every instance depends on the ethical standards adopted by the profession.

Now it seems to me that touching the question of medical education we have a question of some importance, because we are undergoing some evolution on that subject. The relation of the

physician should be close to the medical school. I desire to call the attention of the society to the fact that all of the evils mentioned in Dr. Kremer's paper, it seems to me, originate from one source, and that is the kind of men we admit to the medical profession and the method of their education. Medical education, as you all know, is undergoing an evolution in proportion exactly as every other department of medicine today. Medical education has heretofore been attained by the apprentice method. A doctor had students in his office and educated them there. The next step was that a prominent surgeon or internist, or both, established a medical school, and so we had proprietary medical schools organized upon the name of some prominent individual, with his satellites, and drawing a certain number of adherents. All these did good work in their day and generation. But they only filled their particular time. We go a little further and evolve from the condition where one strong man dominates the school and we have the proprietary school of medicine, and the proprietary school of medicine serves the purpose to a certain extent of educating the medical student in a fairly good way; but unfortunately the dominating influence that generally gives color to the character of education dispensed in that particular class of institution is that a dozen or fifty or a hundred men are elected to do the best they can so far as education and compensation is concerned, but for a purpose which is not proper from the standpoint of medical education, because he is actuated by a desire to further his own interests. In other words, what should be a medical institution founded upon the broad principles of educating doctors who are right morally, and who have the mental capacity to become doctors in the truest sense of the word, and eliminating those indulging in certain practices, is not the type of medical schools that we have reached in this country in many instances. It does seem that that is the type of school we ought to strive for. There are 160 medical schools in the United States. They are built up upon the theory of endowment, some as university institutions, but the vast majority are proprietary institutions. Fortunately, the state has begun to take a hand in medical education. It has already taken a stand in regard to medical regulation. If the state is interested in regulating the practice of medicine it certainly is much more interested in producing first-class physicians for the public.

Doctors are illy compensated, that is the mass of them, and we must recognize this principle so long as the medical profession has to support itself. Law is accused of having grown to be not a profession at all, but purely a business, a commercial vocation, in very many instances. Medicine, we hope, will never become so.

Now we have this evolution I have outlined, and pardon me, gentlemen, if I allude to it, but it is a matter that is interesting all of us. The work and function of this society is the education of students and doctors. These meetings have been partly social, it is true, and it is good that it is, because the social part is a matter of education to all of us. I desire to say in response to the paper that this society is an organized body of the profession through whom all the things the essayist speaks of in the paper should be regulated, including medical education, which is at the bottom of good morals in medicine. You are all aware that a controversy exists in our state. I do not mean that this society should be dragged into that controversy, but I do mean that this is the society from which should originate the standard of medical education, the character of medical education, and it should be done without reference to anything that may exist, but for the future. It should be helpful by its organic, positive action in determining what should be done in Indiana in the way of medical education.

Dr. A. S. Jaeger: I wish to compliment the essayist on what he has said, but one or two remarks I want to take exception to. On the question of abortion, we all know that a man who aborts a woman unnecessarily should be convicted of murder in the first degree; but there are times when abortion is as legitimate a procedure as an ovariotomy or a tonsillotomy, or any other operation. If a woman should be left in a condition where she would suffer and die, but by an abortion I could cure her, I would take upon myself the fault of having committed murder by doing it. But that should never be done without consultation with two or more doctors. It seems to me that with a woman at seven or eight months, every teacher in the country and in Europe is advocating early delivery, even at the expense of killing the child, for rather than take the chance of letting both die we ought to save the greater at the expense of the lesser.

As regards contract work, we all know that is bad, but with all due respect to the surgeons who are doing work for the railroads and the large corporations, who are men of prominence, the principle is just the same as in the case of the poor devil who works for the lodges and societies at two dollars a head to keep body and soul together. A friend of mine, a prominent railway surgeon, told me last year that his amputations averaged him about twelve dollars. It does not seem right. His work is worth more than that. It is worth at least $50. The fundamental principle is the same, whether a man is working for a large corporation or a small lodge at two dollars a head. But the laborer is worthy of his hire, and a man is usually paid as much as he is worth, and this thing will equalize itself in the long run.

Dr. N. A. Kremer: I appreciate Dr. Jameson's stand on medical ethics. I am glad he had the opportunity to bring out these points more thoroughly than I had in such a long paper. I also like the stand Dr. Jameson has taken in regard to medical schools and preliminary education. That has a great deal to do with the kind of physician turned out.

As to the railroad surgeon and the doctor for the lodges, if the railroad surgeon receives $12 for his services, that is just $10 more than the lodges pay, and if a man had to depend on that lodge work for his bread and butter he would go hungry, I am afraid.

FAMILY HISTORY AND HEREDITY.

BY W. W. COREY, FORT WAYNE.

General practice offers daily means to an end; or rather, patients whose ills we study to learn their cause, mode of action and method by which this complicated mechanism can be best adjusted. Deviations from the normal functions and structure are inherited or acquired. Hereditary transmission may be temperamental, functional or structural. This includes that imponderable quality known as hereditary predisposition, hence "family history."

In heredity we assume or know that the different conditions are the result or follow the result of certain changes having taken place in the progenitors before them, and of which we learn by personal observation or the observation of others; hence heredity is that biological law by which all beings endowed with life tend to repeat themselves in their descendants. By it the groundwork remains unchanged through incessant variations, and by it nature ever copies and repeats herself.

Heredity extends to all the elements and functions of the organism, its external and its internal structure, its maladies, its special characteristics and its acquired manifestations. It may be traced in all that concerns the complexion of the skin, the shape of the body, mode of walking and habits of pronunciation. One author says obesity is the result of an organic predisposition; it has often made its appearance under privation and the disadvantage of hard labor.

Therefore, assuming that both parents are alike, or, if different, that both have an equal influence on their offspring, we have white parents, white child; black parents, black child. Another example, a race of women having a height of five feet nine inches, and six-foot men being selected in each generation, by the time the sixth generation was reached we would have a race of six-footers, and this would be permanently established. The length

of time to consummate this change would be 200 years. (Pierson.)

Heredity occurs in the fluids of the body as well as in the solid parts. That the blood is more abundant in some families than in others is well known; and this transmission may predispose to hemorrhage.

Heredity is also shown in the reproductive powers. Some families are known for their fecundity. For example, a mother gave birth to twenty-four children, among them five girls, who gave birth to forty-six children in all, and a granddaughter on the son's side who gave birth to sixteen children.

Brooks makes the interesting statement that the separation of the sexes has been brought about as a sort of specialization of the individual in two directions. The male cells are supposed to accumulate the newly acquired characters, and represent the progressive element in evolution. The female cells, the conservative element, hold on to what has been gained in the past. Granting this to be true, it might account for the inherited tendencies which seem to pre-elect to the maternal side of the house.

This brings us up to the premise known as the law of Galton, in which he takes into account not only the parents but also the grandparents. He goes on to show that the inheritance from the parents can be represented by the fraction ½, i. e., that one-half of the peculiarities come from the parents, one-fourth from the grandparents, etc.

In ten generations there will be 1,024 individuals, as a general estimate, providing no intermarriage has taken place. From this it would seem we would have a community of like individuals, but such is not the case, selection having taken place.

As to the marriage of relatives Maupas claims that the union of individuals having the same immediate descent is profitless. That this is true can be easily verified by investigating the homes for feeble-minded, epileptics and almshouses. No wonder the state is anxious to throw around its citizens its arm of law and say who shall and who shall not enter into the marriage relation. Calkins suggests that the results coming from such marriages is due to the similarity of the chemical composition of the two protoplasms of the parents, the individuals concerned.

Heredity and long life are also closely associated. It is now

shown that longevity depends far less on race, climate, profession, mode of life or food than it does on hereditary vitality. Special treatises on this subject show that we find centurions among the black as well as the white, among those who have taken the greatest care of themselves as well as those who have lived the hardest lives. Everything tends to show that long life is the result of an internal principle of vitality which individuals receive at birth, and is so deeply impregnated in their nature as to make it apparent in every part of their organization. Insurance companies make much use of these facts; hence the importance of knowing the length of life of the applicant's progenitors.

In taking up the reports of our various state institutions I find the following:

Dr. Holloway in his report for the year ending 1905 of the Soldiers' and Sailors' Home for Orphans says: "We have had to care for during the past year a greater number of those unfortunates who come to us bearing the taints of heredity and constitutional disease than ever before, and from these causes have occurred three of the four deaths in our institution during the past year. Number of inmates reported, 577."

In the report for the Institution for the Blind we find no deaths for the year. Number of inmates, 162. The doctor says in his report "that hereditary commissions and omissions balance up the wilful sins or unavoidable mistakes of others." Institute for Deaf and Dumb, 345 inmates, two deaths. Nothing is given by which a statement can be made. Home for Feeble-minded Youth —Number of inmates October, 1906, 1,081; number of deaths from various causes, 18, or 1.86 per cent., an institutional death rate that the state can be proud of, and which testifies much to the care and skill of its medical director. Of the eighteen deaths in the institution more than 50 per cent. of them can be traced to inherited causes. But not all our feeble-minded people are under such good care. We had August 31, 1906, 486 men and 426 feeble-minded women in our county poor farms, with no restraint or control whatever. Many of the inmates were hired out for a small fee during the summer months. Many of these are women, who, going out into the world, meet with men with lowered brute instinct in so much that they return to the home as a maternity house, and the state has one more pauper to provide for.

Barr says in speaking of the feeble-minded "that the influence of each and all tends to a complete degeneracy in which all mental degeneracy finds logically its mental abode." Buch and Shuttleworth find in 392 cases 15.47 per cent. of inherited causes.

Carson in the study of 1,000 cases finds 132 imbeciles. He also reports the investigation of the descendants of one insane man for seven generations as follows: 25 pronounced neurotics, 9 insane, 3 imbeciles, 3 epileptics and 10 stillborn infants, 50 in all, abnormal descendants. A care and cost to the state, a millstone to themselves and friends and a condition for which they are in nowise to blame, but which they can not surmount.

There are in Indiana at present 920 epileptics in state and county institutions. That we are at last to have a separate institution of these unfortunate people is a step in the right direction. Gowers says of epilepsy: "There are few diseases in the production of which inheritance has greater influence."

Some authors claim that those cases coming on only in early life are hereditary, but Gowers says that it may come on at any period, and gives the following tabulated account of 1,113 cases observed by him:

Under twenty years, 844 cases; hereditary history, 319, or 37.8 per cent.

Twenty to forty years, 235 cases; hereditary history, 80, or 34 per cent.

Forty and over, 34 cases; hereditary history, 9, or 26.5 per cent.

Spratling says that close students of nervous disease come sooner or later to feel the force of Maudsley's statement of the different forces, wherein he says: "There are neither accidents nor anomalies in the universe, but they come by law and testify to casualty, and it is the business of science to find out what the causes are and by what law they work." Dr. Peterson, president of the board at Sonyea, in his annual address says: "Among the several thousand cases observed by me I have never yet met with a case of epilepsy due to a reflex factor, although I have made it a point to invariably seek for such a cause."

In insanity it is the unstable, nervous organization that is inherited, not the particular neurotis or phychosis, and it must be our aim to seek for such manifestations amongst our patients' progenitors. In the report for 1905 of the national conference

of the Associated Charities it is shown that the actual increase of insane persons in our state institutions for the year was about 5,000.

The number now receiving care in our state institutions has already reached the alarming figure of 4,254, with 417 on the waiting list. Herter says: "Conditions of abnormal heredity underlie many morbid states of the nervous system. A neurotic heredity may be traced in the majority of all cases of insanity. The graver forms of insanity, especially paranoia and other allied conditions, always develop on a hereditary degenerative basis, but the simpler psychosis, mania and melancholy, may develop in persons without known hereditary taint. Greisner says: "Statistical investigation strengthens very remarkably the opinion generally held by physicians that in the greater number of cases of insanity a hereditary predisposition lies at the bottom of the malady."

We will now consider briefly two other diseases in which heredity plays a part; that is, syphilis and tuberculosis.

The syphilitic, like the poor, we always have with us, sometimes carrying his mark so that he who runs may read, and again showing itself only to the initiated.

Paternal transmission is of more frequent occurrence than maternal. It may come from either side or both. Drs. Schaudinn and Hoffman, of Berlin, have discovered a microscopic body which they term spierochata pallida. This they have found in the initial lesion, buboes and in twelve leutic infants. Metchinkoff and others have demonstrated the same. The significance of this has not altogether been decided, but that it is important can not be denied.

Hereditary syphilis is capable of provoking any and all of the injuries of the general nervous system that follow the acquired infection, and, like it, is often marked by a multiplicity of lesions in a given case. They may appear in early life or be postponed until later, often appearing in the twenties and thirties. The lesions of hereditary syphilis are less amenable to treatment and of worse prognosis than those of the acquired form.

As to direct hereditary transmission of tuberculosis Anders says: "In exceptional cases the bacillus is found in the foetus in utero. In such cases the disease may remain latent to break

forth in childhood or later in life, and although the foetus itself may display no evidence of tuberculosis, the foetal viscera may be infective to guinea pigs. Lehman reports a case of tuberculosis, the mother dying from tubercular meningitis three days after the birth of her child. The child lived twenty-four hours, and upon post-mortem the lung, liver and spleen were found covered with nodules resembling tubercles and containing tubercular bacillus in large numbers.

Baumgarten believes that the contagion may be transmitted and become pathogenic at a veriable period after birth. First, because the infection is very frequent in young children, and secondly, because certain structures not apt to be accidentally infected are commonly the seat of the lesions, i. e., the bones and joints.

Jonathan Hutchinson in his Law of Inheritance in Disease says: "Two factors are admittedly of great importance in reference to the development of the affection. We must take cognizance not only of the bacillus itself but also of the state of the tissue upon which it is implanted. The possibilities of inheritance are therefore twofold. It may be that the bacillus itself may pass bodily or potently with the sperm or germ from parent to child, or it may be that a condition of tissues liable to the attacks, but for the time free from its presence, may be the result of transmission. Pathological facts leave us in no doubt that the tubercle bacillus may find its way into the body of the foetus in utero and then develop. Whether it does so in the association with the semen or in union with maternal germ, or whether it is always derived by the ovum from the mother blood we are as yet uninformed."

It is clear, however, that as regards the heredity of phthisis we can at present do little more than state preliminary facts and suggest possibilities, and the prevailing creed which suspects external contagion as the cause of all attacks is probably a much too narrow one. With these few truths presented to us it seems that the importance of the history of our patients' progenitors ought to appeal to us more strongly.

Family defects are becoming to be more deeply inquired into, with a much more decided result than before. People are studying their children and trying to build up the environment and influence which will best tend to develop the talent given. Chil-

dren are being taught in our public schools how to develop the body as well as the mind, and are given exercise which will tend to correct any bad habits they may have acquired. The introduction of manual training is to be highly commended, inasmuch that it may detect talents that no one suspects, and with the right guidance he may become a second Edison.

As regards the family history, it is not easy to turn to the father and ask if his people had fits, or to the mother and ask if there were any crazy people on her side of the house. Such history when necessary must be gained by tact and not in the presence of others. A great many times it can be procured from some other member of the family who you can ask to call at your office on some pretext or other.

Families in which there are neurotic taints ought to be told so if they do not wish to acknowledge them and taught how to overcome them. If serious ones, the result of marriage of such an afflicted person and the crime they are committing and the shame they will bring to their offspring, who will come into the world handicapped, as it were. Some one has said: "A body weakened by sloth and dissipation, an intellect enfeebled by ignorance and disease, and a conscience seared by immoral habits and thoughts will invariably lead to disappointment and failure."

Families are marrying and remarrying into families with neurotic taint, tuberculosis and epilepsy, and without any word of advice from their family physician as to the fitness of their marrying. This training must start with the family doctor, whose duty is growing more and more to so surround his patient or direct him so that he will not become ill but lead a long and useful life. Is a home happy in which there are children bearing a malady which the father can say he or she got that from the mother's side, or vice versa? How much better if this could be avoided, and it can by educating the people to find out their shortcomings and, as the dog fancier says, "breed according."

I have in mind one case I will report. The daughter, an accomplished girl, pretty, robust and to all appearances healthy, with the exception that sometimes at night she has peculiar spells. On her father's side are three epileptics. The young man in question, one of our school teachers, small in stature but full of vim and hustle; nothing the matter with him, but he has a brother

in the Logansport asylum, a sister who probably not more than six people have seen, outside of the immediate family, with two members of the family dead from spasm in infancy. These people marry; in the course of time a child is born and another idiot added. The future cost of this can not be estimated either to the parents or state. The demands of motherhood were too much for the girl and she is now a confirmed invalid. This is happening everywhere and all the time, and how much more important it is to see that every human life has a fair show than it is to see that our bulldogs, horses and pet breed of chickens have the right cross.

As the burden of expense of caring for the unfortunate falls on the state, why should not the state have a voice in the matter. Back of the state are the people who are being taxed for the support of our various institutions, and who annually proclaim with one accord that they are being robbed for the benefit of the few. It now lies with the people themselves to help solve this matter, by assisting their physicians in helping to avoid those things which contribute to or tend to develop the disease in question. Mr. Physician himself should be more careful in filling out statistical blanks which may be furnished by the state for the purpose and which would be our only means of reference. Not that we may eliminate entirely these dreadful scourges of inheritance, but that each coming generation may be better able to guard each succeeding generation more carefully.

Gentlemen, it seems to me that anything that will lessen the curse of inheritance of father to son will lessen the ever increasing number of unhappy homes, the number of inmates in already overcrowded institutions, and deserves our very best efforts. It will not only be a crusade for the white plague but one for a fair chance.

DISCUSSION.

Dr. Spink: This was certainly a very interesting paper, and I am very sorry that so few stayed to hear it. Of course when we talk of heredity, as the doctor has just said, we must begin back at the protoplasm, the beginning of things, and we must then decide the point as to where heredity begins. We know, of course, as far as disease is concerned, that pathological tissues may be

alive, and that is the view of some of the best pathologists. One of the facts is that diseased conditions from germs get into the organisms. I believe that through heredity generations can be modified and changed and elevated; in other words, we can select the best classes and by correct breeding elevate the race of people.

RHEUMATISM AND ITS TREATMENT.

BY F. J. WALTER, M. D., MUDLAVIA, KRAMER, IND.

In the short time allowed me it is difficult to any more than give you an impression of some views regarding the nonexistence of the entity of rheumatism as a disease. I can not believe there is a specific germ of rheumatism. I do not believe there is such a disease as rheumatism. The term certainly directs us to no pathological condition. We need a better general understanding of the relation of the diseases of the joints to the various common infections and the relation of auto-intoxication to myalgia. Certainly a great deal of neuritis is overlooked, as we may have a localized neuritis of the very small nerve twigs in the muscles as well as the nerve trunks. Most joint swellings are infections or exudations. The infections are the common germs that produce tonsilitis, pneumonia and gonorrhea, erysipelas, scarlet fever or the germ of la grippe. By careful examination we can usually find some avenue of entrance of these infections, if only the cavity of a tooth. With auto-intoxication infections are made to flourish in fertile soil. The gonorrheal and tuberculous joints give us a definite picture, and we put them off by themselves as understood. This is not right, for the other forms of arthritis have many more characteristics than are shown superficially. Doubtless there is a mixed infection or a diplococcus which at times gains entrance and produces variations in the symptoms similar to the infections mentioned, but as to there being a specific germ of so-called rheumatism, we can find everything in the history to refute such views. In some forms, as in gonorrhea, it is said the germ is not found in the joints but the products of germ life, the toxin.

We know we can have pneumonia of a joint and not have it in the lungs. In other words, the pneumococcus, or toxin, may go to a joint and escape the lungs entirely. We call this "acute rheumatic fever" or "acute articular rheumatism," while in reality these terms apply to acute poly-arthritis (though all cases of poly-

arthritis are not produced by the diplococcus of pneumonia). We have typhoid, gonorrheal, tubercular, pneumonic and post-"la grippe" forms of arthritis. Arthritis deformans is an infection (progressive in those of low resistance), and we do not know just what germ causes it, perhaps not always the same bacterium, but with it we have a trophic disturbance of the spinal centers, bilateral. There is every evidence of nutritional change in the muscles, joints and nerves. These cases are years coming on; at times with long history of indigestion and urine loaded with urates, uric acid, oxalates and other evidence of incomplete digestion, such as flatulent dyspepsia, anemia and weakness. Now, we must associate in our minds infection, inflammation and poor nutrition with feeble powers of absorption and what is absorbed of poor quality; then we have an intelligent idea of arthritis deformans. We may have tabetic and hysterical joints. Is it not better to distinguish between all forms of arthritis and classify them than to simply diagnose "articular rheumatism?"

Of neuritis we have several forms—traumatic, infectious, toxic, inflammatory (without the definite infection known) infiltrations, reflex and from pressure. Of the toxic forms of neuritis we have those of lead, arsenic, alcohol and auto-intoxication, all affecting the nerve trunk, sheath or the periphery; the sciatic nerve or any other may be the one chosen with a variety of sharp, lancenating or burning pains. What is the use of adding "rheumatic" to the already better diagnosis of sciatic neuritis, peripheral neuritis or neuritis of the anti-crural nerve? To be sure, we have muscle contraction from muscle irritation. Look out for neuritis in the diagnosis of intercostal neuralgia and other local persistent neuralgic conditions, and look out for tabes-dorsalis in the diagnosis of neuritis of the legs.

Now, what shall we do with "muscular rheumatism?" In the muscles we have a large surface for circulation and absorption, absorption of the toxic products above alluded to—the products of indigestion—also sprains, fatigue and trauma. It is just here that it is most difficult to apply the proper diagnosis, as we are so prone to say, "muscular rheumatism," yet we can fathom the cause and apply a term meaning more than the term "rheumatism." Some say: "Give the salicylates, and if it assists it is 'rheumatic.'" I believe that the salicylates act on the pain as

an anodyne. Many cases are apparently cured because the salicylates and salol are such good intestinal antiseptics and antacids. We can apply our electrical tests here and find some cases of neuritis. In these cases of auto-intoxication the system is highly acid. I find nearly every case turning litmus red in the mouth. The dentist will notice it in the tartar of the teeth before the definite pains come on. How this goes to prove saturation and absorption of the products of fermentation. In local conditions of the feet don't forget "flatfoot." With a stock of foot arches on hand of every size one can cure many cases of so-called "rheumatism" of the feet. In pains of the legs look for varicose veins. From the practical experience of 3,500 cases a year at Mudlavia I am learning that uric acid as well as leukomains, oxalates, urates, cystin, phosphates, indican and decreased urea are symptoms of this condition and somewhat of a barometer of the case; uric acid is not the cause. With poor elimination these things accumulate, yet are influenced by diet. These products certainly are found most often in those of sluggish habits, poor lymphatic circulation and sedentary lives. These products of decomposition of the food circulate in the blood and are irritants to cell life and intoxicate more or less the brain centers, as well as act as active irritants to the endothelium of the kidneys, producing "Bright's disease" and bladder irritation. As a guide to our treatment and diagnosis it is well to keep in mind the amount of toxaemia, the resistance of our patient, the presence or absence of infection, the degree of inflammation, the nutrition, the vitality, the social conditions, the character of the food, the amount of exercise the patient can and should take, and what is very important, glandular action and elimination.

Proper food, intestinal antiseptics, tonics, antacids and active elimination by every means of escape is very necessary. The skin is a larger organ than the liver, and elimination by its wonderful excretory glands is not to be overlooked. This is why hot baths and mud packs do so much for this class of cases. These people are or have been large eaters, fond of the good things of life, and have "the best in the land" on their tables, but they have been unable to take care of it; what is more, they do not know in time that they are not digesting and eliminating properly. They will remark that a selected diet is excluding just what they like, and

yet this does not mean that we have to starve them. It is not easy to find what will produce the least evidence of auto-intoxication, though by patience and individualizing we can in some little time produce gratifying results in most obstinate cases. In gout one will find the patients overloaders, and it is but another phase of this same condition with a lowered resistance and an acute infection developing which produces the acute attack. I think that one will find that practice will bear out these preliminary remarks.

For convenience we may classify the so-called rheumatic diseases into the following: Auto-intoxication, arthritis, neuritis and synovitis. There are many subdivisions.

For the actual proof in laboratory and clinic of the symptoms of auto-intoxication it is worth any physician's time to read the experiments of Bouchard, of Paris. A practical physician recently expressed himself to the writer by saying Bouchard's work had done more for him than any book in his library.

The evidences of auto-intoxication are as follows: Myalgia (so-called muscular rheumatism), constipation in 80 per cent., gastric or intestinal indigestion or fermentation; in the urine decreased urea and solids as well as indican, oxalates, urates, uric acid, perhaps a few hyaline casts and a trace of albumin from kidney endothelial irritation. The common symptom of having poor circulation, "cold hands and feet," is most frequently a symptom of auto-intoxication, poisoned vasomotor centers. With this condition of affairs the patient is in a receptive state for infection, and this explains why arthritis so often coexists. Eczema, psoriasis, chorea and uraemia are unfinished pictures of this entity. The so-called "uric acid rash" and the burning of the extremities are also complications. The coloring matter of the urine and bile are sometimes retained, giving a characteristic hue to the skin. The sequel to auto-intoxication is frequently "Bright's disease" from kidney irritation. The treatment is to overcome constipation, intestinal antiseptics, salines, hot baths, alkaline waters, hepatic stimulants, diet, massage, out of door exercise and lymphatic stimulation.

ARTHRITIS.

The arthritis of so-called "acute and chronic articular rheumatism" is an infection coming through the tonsils, lymphatics, glandular tissue of the intestines and vermiform appendix, the mucous membranes of the head and throat, ulcerating or suppurative foci, the urethra and lungs. It frequently coexists or follows in a short time tonsilitis, typhoid, la grippe, pneumonia, scarlet fever, gonorrhoea, erysipelas and mixed infections. Neuritis and myalgia may be associated with auto-intoxication. Low vitality, nervous exhaustion and gastric fermentation usually accompany well developed chronic cases. If we are positive there is no infection it teaches us to make a differential diagnosis for other forms of neuritis, syphilis, central and peripheral nerve lesions, "joint mice" synovitis, hysterical joints and the effects of trauma. We are all familiar with these symptoms. The treatment is the same as for auto-intoxication, with many details added, which are a nourishing diet, nuclein, fresh air, mental rest, absolute rest of the joints involved, which means no massage during the acute and sub-acute stages, galvanism, antacids, climate, baths and the cheerful co-operative mental attitude. The theory of treating the patient and not the disease must often be kept in mind until you have some reaction established. Hot baths can not be given in high blood pressure, dilated hearts, arterial-sclerosis, a temperature of 102° and with great emaciation. Baths do their part by elimination, equalizing the circulation, relaxation or stimulation as desired, and at resorts in placing the patient where he will make a business of getting well. The best results come from long baths at an even temperature. Too hot baths cause a marked aggravation by distributing through an excited circulation these toxines; extra hot baths cause fainting and general aggravations, at times driving the patient to bed. All this can be avoided by more, longer and cooler baths. Patients will want the temperature warmer than is best for them in the hope of hastening matters. Shifting pains and increased swellings (at the beginning) in bath treatment are looked upon with favor. Localized, persistent inflammations are more stubborn and slower. Most any compensated heart can stand baths if due consideration is used. The head should be elevated and the bath cooled down somewhat quickly and of short duration. Considering the value

of elimination and increased circulation the baths can not be other than the sheet anchor in the treatment of these diseases. My personal experience has been with the mud bath; the feature which commends itself is the evenness of temperature, the absence of chill, free perspiration and restfulness. With a water and mud bath to choose from, the patient who has once had a mud bath will totally ignore the water bath and express great satisfaction and relief from the mud. It is important that the use of the baths should be associated with the drinking of quantities of a pure alkaline water, and during the bath three or four glasses should be taken hot. Strongly acid urine can quickly be made neutral by the use of phosphate of soda and vichy water. The acidity in these patients is largely due to fermentation in the intestines. I should like to deal with water drinking, exercise, diet, electricity, massage, climate and drugs in detail, but have done so in a previous paper in the New York Medical Record of January 19th.

It is a common thing in practice to find a large number of cases of neuritis which have been overlooked and diagnosed "muscular rheumatism." In neuritis the parts are sensitive to the touch, the pains are neuralgic and often burning, localized; unless it be a general peripheral neuritis, the response to the electrical tests are quick and definite. There is usually a history of some intoxication and a lowered resistance after exposure to cold and dampness, bringing on an acute attack. The sciatic and the nerves of the arms are the ones most often involved, burning and numbness with a cold surface are common symptoms. Massage, osteopathy and vibrations tend to aggravate all forms of neuritis in the first stages; this is true in all acute inflammations. We must learn to put acute inflammations at rest. We do not stimulate appendicitis or lymphatic swellings; why should we irritate with massage or electricity the sensitive serous surfaces of the joints and nerve sheaths and expect resolution? This may "numb" an acute inflammation for a few hours and the results seem good; but watch for the reaction the next day, in which there is no real improvement; cramps will follow from nerve and muscle irritation. In acute and some sub-acute inflammations massage elevates the temperature, predisposes to infection, distributes infection, increases the liability to endocarditis and weakens the patient. Hundreds

of patients with neuritis are kept under treatment by their persistent massage. The points to keep in mind in neuritis are rest, elimination and heat. Discourage motion in sciatica; keep off the feet, put to bed, or in milder cases use crutches (not a cane) and keep pressure off the nerve. Many cases would end in a week's treatment by being put to bed and moist heat applied. Massage is useful to increase the circulation and break up adhesions in subacute and established inflammations, to the point of producing some reaction and hyperaemia to promote absorption.

Finally I wish to speak of operative measures and of some of the most effectual drugs and their indications in so-called "rheumatism," viz., arthritis, neuritis and auto-intoxication.

First of the operative measures let us mention the Bier treatment because of recent experiments with it. Joint cases are being reported with most satisfactory results. The principle is that of hyperaemia producing absorption, followed by resolution which is brought about by construction of a rubber bandage above the affected joint, to be worn all night or part of the day and all night for a period of from ten to fourteen days. It can be used in acute arthritis and as a rational treatment for the slow, chronic inflammations. Baths will produce a mild degree of hyperaemia, and perhaps some of the good results from the Bier treatment reported in the journals have previously been brought about by baths. This treatment is as yet in the experimental stage, and experience will tell us its worth. All pus joints should be opened and drained, splints or plaster used and the joint placed in a position to be of the most use in case it should become ankylosed. Exudations and soft, noninflammatory swellings are best treated by the use of the elastic web compression bandages, first applying a cotton bandage below to prevent swelling of the parts. The operative treatment of sciatic neuritis should be limited to the removal of all sources of reflex and direct irritation and to casts. Have all piles removed, attend to rectal strictures or any growth in the region of the nerves, immobilize sacro-illiac disease, keep the principle of "inflammation at rest" in mind. It is not best to advocate nerve stretching or vibration in the acute stages of neuritis, some few good reports to the contrary. Salt injections are helpful. It is certainly of the utmost folly to speak of specific drugs for these numerous complications. Other

means of therapeutics must be combined, else we are planning a "hit or miss" campaign of the worst form of humbug. The whole picture must be studied and stress laid upon prophylaxis. One will find himself at times treating the nose and throat or sending a patient who can afford it to a suitable climate as a prophylactic measure. In their order I will enumerate the class of drugs usually used to treat a developed case., viz., intestinal antiseptics, eliminants (cathartics, diuretics, diaphoretics), hepatic stimulants, antacids, tonics (glandular, nerve and muscle), alteratives, anodynes, antiphlogistic applications, counter irritants, antipyretics, antispasmodics, spinal sedatives, cardiac stimulants and serums. As to the intestinal antiseptics, stress should be given aspirin, salol, guaiacol and the alkaline salicylates. An admirable combination as an antacid, intestinal antiseptic and anodyne is a five-grain capsule of equal parts of aspirin and acetphenetidinum and caffein citrated, to be given as required. For acute, painful conditions it will be of daily use. In extremely painful localized inflammations add one-quarter to one-half grain of codeine. Salicin has its advocates, but has no advantages and some disadvantages. Aspirin scarcely ever causes gastric irritation, as it is split up in the intestines. The sulpho-carbolates of lime, zinc and soda, with salines for bowel elimination, have many followers and is good treatment. As laxatives we can use sulphur waters, salt water, magnesium sulphate or citrate, Rochelle salts, most any aperient water, cascara, Henkle's cascara pill formula, or combinations for complications of calcium, lithium salicylate, with colchicine, or in slight torpidity with the proper indications the following tablet will be followed by good results: q. i. d. lithium salicylate 5 grains, macrotin ¼ grain, phytolaccin ⅛ grain, colchicine 1-150 grain. An active saline is: magnesium sulphate one pound, aromatic sulphuric acid one ounce, essence of gaultheria two drachms, aqua one quart, mix, filter; dose, from one to two ounces occasionally. Of hepatic stimulants, calomel or the following: podophyllin ¼ grain, lepandrin ½ grain, irridin ¼ grain, extract of nux vomica 1-16 grain, pulv. capsicum 1-3 grain, mix. Antacids: alkaline waters, sodium phosphate and vichy water, aspirin soda bicarb. Throat and nose prophylaxis should consist of the free topical use of peroxide of hydrogen, glycerine and water, equal parts, as a spray

and gargle, followed by alkaline antiseptic washes and oleaginous antiseptic sprays. Tonsillitis will sometimes be improved by the use of equal parts of oil of sweet almonds and liquid guaiacol as a spray; this should be repeated. It is an irritant, but the irritation passes off soon and will produce gratifying results. Camphor and mentholin oil can be used freely for the same symptoms. Hammamelis, calendula and pine in oil for the more chronic inflammations will be found useful. Surgery and the cautery may be required. Of the tonics, those which build up the nervous, muscular and glandular tissue should be combined. The hypophosphites, phosphoric acid (in neuritis and neuresthenia), hydrastis alkaline elixirs, quassia, gentian, syr. iod., iron or soluble iodine. Of late formic acid is being used for muscular fatigue and as a muscle tonic. Olive and cod liver oils are nearly always indicated. Strychnia should not be given at all in hyperasthesia of spinal origin. This drug is not well borne in many nervous conditions. Fowler's solution in wine with colchicine and intestinal antiseptics should always be considered. The iodides and mercury lead the list of alteratives, bichloride 1-40 grain three times a day. Of the anodynes use: aspirin, phenacetine (acetphenetidinum), codeine, morphine and local applications, such as ointment of the following, applied under cotton: oil of gaultheria, menthol, crystals and the tincture of opium, of each one drachm, liquid guaiacol one-half drachm to four ounces of lanoline. A liniment of the following, applied hot under cotton properly held in place by a bandage, is of temporary relief, viz.: oil of gaultheria, menthol crystals, tincture of aconite, tincture of opium, of each one drachm, chloroform and soap liniment, of each two ounces, and glycerine four drachms. Antiphlogistic applications of hot mud, clay and glycerine. Serums are as yet in the experimental stage, and the results from such experiments will depend largely upon the isolation of specific germs and the methods employed in the manufacture of the serum. So will the opsonins. Some experiments are being made in the use of antigonorrheal and anti-streptolytic serums. It is a great field and promises much. With several cases we have had no definite result. Plasters of belladonna, rhus tox. and bryonia are palliative. It is seldom necessary to use irritants; the best is the tincture of iodine. I will not detail the symptoms of synovitis.

CONCLUSIONS.

(1) The various infections will account for every form of so-called "rheumatism" except muscular, and that is an intoxication. This intoxication accompanies or precedes most articular and some nerve infections.

(2) The term "rheumatism" is a misnomer, but must be used for a time until the evolvement of real facts are appreciated by the profession and laity.

(3) Better diagnosis brings intelligent treatment.

(4) Intelligent treatment means the use of combined methods and a thorough working knowledge of the case. This should consist of prophylaxis—better understanding between patient and physician, with attention in the main to social conditions, diatetics, exercise (or rest), massage as indicated, elimination by proper baths, fresh air, the right co-operative mental attitude, and in some cases climate.

(5) Auto-intoxication with faulty elimination is directly responsible for these conditions.

(6) That it is necessary for physicians to make a greater study of the toxic effects of leukomaines and more stress given to the findings in the urine of the products of indigestion.

(7) An examination of the urine is important in every case for these products of metabolism as well as albumin, casts and sugar. It means more than the patient can tell us about their evident indigestion.

(8) Heredity has no effect except as establishing social conditions to be followed by the family.

(9) The importance of baths and the precedence of hot mud baths over other baths for equalizing the circulation, stimulation of glandular activity and elimination.

(10) The avoidance of sedentary lives and also of great muscular fatigue, the latter a cause of muscle pains in children and workingmen.

(11) Alkaline waters and drugs hold a great place as antacids and antiseptics to the intestines, though greatly abused.

(12) Hot baths must not be given in dilated hearts, high blood pressure, arterial-sclerosis, tuberculosis and any great emaciation, though are indicated in auto-intoxication without such complications.

DISCUSSION.

Dr. A. S. Jaeger: If I am never asked to discuss another paper before a society there is one thing I wish to go on record as saying, and that is that acute articular rheumatism is a specific germ disease. I am free to admit that we have not discovered the specific germ, but a disease that acts in the way this disease does can not be considered in any other way. I am also free to admit that intestinal intoxication is a predisposing cause of rheumatism, and is a cause of the lodgment of the germs that produce the disease, as well as in many other diseases. We all know if the body resistance is sufficient we do not have disease. In cases of articular rheumatism we do have an intoxication so that the germ can make its onslaught, but I can not agree that acute articular rheumatism is the result of any acute infection by pus germs, as in articular rheumatism we never have pus. In the main I agree with what Dr. Walters has said in his paper. It was well put up, and even though he is an official of a springs resort he has made no special reference to his particular water or mud.

Now the experience of those dealing with rheumatism is that there is frequently a misdiagnosis. The general practitioner sends cases and says they are rheumatism. I examine every one of such patients that comes to my office to see if he has not flat foot, and it would be surprising to know how often it is flat foot, and we put them on the sole that Dr. Brayton recommends and they get well. The only thing I have found good in the treatment of acute articular rheumatism is heat and some form of the salicylates. I can not help but feel that salicylic acid or one of its derivatives is a specific in rheumatism.

Dr. H. C. Burcham, of Albany: It seems to me we are dealing with more than one disease condition. The clinical picture of acute articular rheumatism or rheumatic fever seems to me one thing, and probably depends upon germ origin. The fibrosities we so often get as in the symptoms of gout or rheumatics following scarlatina or other systematic poisoning is different again. I think we might continue to use the term rheumatic fever for the acute condition, but I look upon the chronic conditions as due to different causes not of germ origin.

Dr. Theo. Potter: It seems to me, Mr. President, really a great

pity that this paper, one of the most intelligent and most practical, and one of the most valuable presented at this meeting, came at a time when we all feel we have not time to discuss it. Every one who has followed the discussions of the American Medical Association from the New Orleans meeting until now knows well the movement for abolishing the term rheumatism and substituting a more accurate term, and this paper, in my mind, represents a very valuable index of that revolution. That is all I wanted to say, but I do think every member of this association should read that paper when it is published in the transactions.

Dr. H. R. Allen, of Indianapolis: I would like to call attention to one feature Dr. Walter mentioned, and that is the possible error in the diagnosis of rheumatism. Rheumatism has been the scapegoat for any joint affliction the patient might have. A few weeks ago I had a case sent to the State Hospital with tubercular hip joint. He had been to Mudlavia and had all the treatment that went with it, and became steadily worse. When people become enthusiastic about rheumatism they see more than exists, and I am inclined to think like Dr. Jaeger, that a little further diagnosis should be resorted to before ruling out rheumatic arthritis. Rheumatic arthritis is a constitutional disease characterized by many joints being involved. When one joint only is involved be careful about calling it rheumatic.

Dr. F. J. Walter, of Kramer: We do not have suppuration in acute cases, but I think it is the toxine and not the germ itself. I believe there is a focus of suppuration somewhere that is producing the toxines. I have cases every day that the doctor calls rheumatism, and 75 per cent. show a recent infection, very often la grippe, and it comes about a certain time afterward. They are weak and run down for a long time with that infection and do not build up because there is a source of infection somewhere. If it goes on close to a joint the joint is attacked, but back of that there is the infection that stays there, and the toxines are in the joint and there is no pus focus there. I believe we can not say there is a specific germ any more than there is a specific germ for peritonitis, where we have a mixed infection, and I think we have mixed infections after streptococcus and pneumococcus infections, and with symptoms much alike.

PUERPERAL INFECTION.

BY DR. CLAUDE C. CRUM, OF JEFFERSONVILLE, IND.

The term, puerperal infection, includes all of those pathological conditions that occur from infection at childbirth. It may take on a great many forms and be caused by several different forms of infective material but the manner in which it occurs is always the same; the introduction into the parturient canal of infectious germs from without.

The history of puerperal infection is as old as humanity itself there being cases reported by the earliest medical writers. The cause has been attributed to a great many sources; up to the beginning of the 17th century it was supposed to be caused by a suppression of the lochia, this was followed by the milk metastasis theory and this in turn by all sorts of theories until the time of Lister and asepsis. In 1847 Semilweis, then an assistant in the Vienna lying-in hospital noticed that women delivered by mid-wives did not suffer from infection to anything like such an extent as those delivered by internes who also did work in the surgical department of the hospital. He concluded, therefore, that the internes must have carried the poison on their hands and he instructed them to wash their hands thoroughly in chlorine water and had the satisfaction of seeing the mortality drop from 10 per cent. to a little over one per cent. Notwithstanding these facts he was laughed at by his contemporaries and it remained for Lister to demonstrate the cause.

The etiology of puerperal infection is varied. The resisting power of the woman determines, to a great extent, the severity and duration of the illness. The infection may come through one of several different sources—the patient herself, the hands of the operator, the clothing, the nurse or the douche. The infective agents themselves may be varied; they may be all of one species, or more usually, a mixed infection. The staphylococcus is the germ most usually found and is one of the milder forms of infection. The streptococcus is often found and it produces the most virulent type

of the disease, causing death in a great many cases and always the most grave apprehensions. The gonococcus, by reason of its presence often causes trouble and, if not causing death, often leaves the woman an invalid for the remainder of her life.

The Klebs-Loeffler bacillus, the bacillus pyogenes aureus, the colon bacillus, the pneumococcus and on one or two occasions the bacillus of Eberth have been found causing the disease.

The lesions of puerperal infection are many and varied, they occur in the form of an inflammation of some part of the parturient canal. There may be a vaginitis, a metritis, an endometritis, septicemia or phlegmasia-alba-dolens.

A vaginitis, due to puerperal infection, rarely, if ever, occurs alone, but is part of a general infection; it consists of an inflammation of the mucous membrane of the vagina which often is carried by the lymphatics to the tissues surrounding the uterus forming a parametritis and abscess.

An endo-metritis affects the mucous membrane of the uterus and oftentimes (especially in the streptococcic form) extends to the body of the uterus causing a metritis and a peri-metritis. When the mucous membrane alone is infected the disease extends so deeply in the mucous glands that it is difficult to remove the disease either by the curette or by douches. The mucous membrane is broken down and form debris that comes away in the lochial discharge.

A salpingitis is due to an extension from the endometrium; it is more chronic in character and results in hydro-salpinx or pyo-salpinx which if not removed may in time rupture, causing a general peritonitis. An oophoritis is merely the extension of the inflammation to the region of the ovaries, setting up an inflammatory condition in them.

A para-metritis is due to the extension, either by way of the lymphatics or by direct invasion, of the germs of inflammation which set up an inflammation around the uterus and cause adhesions to form binding the uterus down and, in most cases, causing pus to form and resulting in a pelvic abscess.

Peritonitis may be either local or general according to the virulence of the disease. An exudate is thrown out and the tissues make an effort to circumscribe the infection, which they can do if the infective agents are not stronger than the power of the tissues and

leucocytes to combat the trouble. Adhesions are formed unless the infection is so virulent that time is not allowed for them.

The symptoms are as varied as the parts affected and the organisms causing the disease. They are usually mild when due to the staphylococcus or any other of the germs except the streptococcus, which, in nearly every case, cause very serious symptoms. The symptoms of vaginitis never occur without more serious trouble elsewhere, so they need not be discussed. The symptoms of endometritis are the most varied and usually occur in every case of puerperal infection.

When due to the streptococcus the local symptoms may be very slight and the lochial discharge lessened rather than being more profuse. There is little or no odor to the discharge, but the soreness over the uterus is considerable. The systematic symptoms however are very grave; there is marked prostration and high fever, very rapid pulse, distressed features and later collapse. When the streptococci penetrate the uterus and attack the peritoneum an intense peritonitis is produced which rapidly causes death.

When due to the staphylococcus the local symptoms are more marked, the odor is intense and characteristic, but the general symptoms are not so marked and recovery usually takes place. The lochial discharge is profuse and of a bloody or muco purulent character. The intense odor and profuse discharge are often taken as an indication of a severe case of infection, while the absence of these is conversely supposed to indicate a mild infection. Nothing could cause a greater mistake than this, as the most grave cases are in this way overlooked and a favorable prognosis made in serious cases.

The symptoms in diphtheric endometritis are similar to those in pharyngeal diphtheria except that the membrane is found in the uterus and vagina instead of in the throat. The other forms of infection do not cause any peculiar symptoms of themselves except the bacillus aerogenes capsulatus, which causes a profuse, foul-smelling discharge which is filled with air bubbles and causes it to become frothy. The tympanitis, pain, fever and degree of prostration are very much intensified.

A para-metritis is usually the forerunner of a pelvic abscess which causes a great deal of tenderness at the side of the uterus with fever and more or less prostration. The abscess enlarges and, if not opened and drained, ruptures either into the peritoneal

cavity or into the vagina or rectum or, occasionally, through the skin.

The symptoms of puerperal peritonitis are the same as of ordinary peritonitis except that the symptoms are very much exaggerated and the disease nearly always fatal. The tissues undertake to wall off the infection, but are unable to do so on account of the virulence of the attacking organisms, and a general peritonitis is soon established. The suffering is intense, the prostration very great and the tympanitis marked.

Puerperal infection is to be diagnosed from typhoid fever, malaria, and sapremia. In typhoid the Widal reaction is present, spots often occur on the abdomen, the slow onset of the disease and the condition of the tongue ought to clear up the diagnosis. Malaria is the disease most often mistaken for an infection; it might be said that an infection is more often mistaken for malaria, as malaria is a very common complication of the puerperal state. The diagnosis is made by the fact that malaria responds to quinine, the fever is followed by sweat and return to normal temperature, while an infection causes a continual fever which does not react to quinine. The microscopical examination of the locia will fail to find any evidences of infection in malaria.

From sapremia it is diagnosed by the higher fever and greater prostration, the microscopical examination and more serious symptoms throughout.

A great deal of controversy ensues as regards treatment, especially in the use of the curette. Some surgeons claim that the use of the curette is often advisable in these cases, while others say it were better if the curette had never been thought of in the treatment of puerperal infection. The more conservative view, however, is to use only the dull curette and only in those cases where there is a great deal of broken down tissue to remove. In the streptococcic form matters are only made worse by its use, as the protective wall which the tissues are sometimes able to form, is in this way broken down and at the time no good could be accomplished as there is nothing in the way of debris that can be removed.

In the removal of the uterus there is also a great deal of contention, as some claim in this way the disease can be eradicated while others claim that this only adds to the general prostration and no good comes from it. At least this operation is advisable in the

condition of multiple abscesses of the uterus which fail to heal. The whole process can in this way be removed from the body and a cure accomplished.

The use of douches do good in so far as they remove broken down tissue and are to be used mostly as an aid to the curette. It is helpful, however, in that it removes debris and checks the disagreeable odor in some forms of the disease. The use of the douche should be done with the greatest precaution as to cleanliness and is not to be intrusted to anyone except an experienced nurse under the direction of the surgeon in charge.

Constitutional treatment forms one of our greatest assets. Strychnine and whisky is our main dependence as far as stimulation is concerned and should always be given where there is any degree of prostration. Sponging to reduce fever should be preferred to any antipyretic, as the depression from any of these is apt to cause trouble where there is so much prostration.

Of late years the use of serum has been advocated in these cases, and I have seen what appeared to be excellent results from the use of them.

(Dr. Crum's paper was lost during the session and was not received by the Editor. Under date of September 23, the following note and abstract of the paper was received by the Editor:

"Enclosed you will find an outline of my paper on puerperal infection. It lacks a great deal of being a finished paper, but it is the best I can do at the present, as I haven't the time to go deeply into the subject and, as I said before, I have lost all my notes on the subject.

Trusting that this will answer the purpose, I remain,

Yours very truly,

CLAUDE C. CRUM.

—Editor.)

DISCUSSION.

Dr. C. E. Ferguson, of Indianapolis: There is no question that could come before physicians that is fraught with more interest than this single question of puerperal sepsis. Despite the fact that we know all about how sepsis occurs, and we are supposed to practice asepsis, the statistics show that the deaths following child-

birth are almost as great outside of lying-in hospital institutions as before the discovery of the germ theory. This seems like an exaggerated statement, and yet it is borne out by the statistics that I have recently looked over. The infection that we meet is due to a large number of causes; the great difficulty is in making the diagnosis. We have many varieties of organisms that cause sepsis, and so many types of sepsis; these outbreaks, although depending upon the same kinds of germs, may vary in intensity on account of the very great variation in the virulence of the organism. The paper is valuable because of the stress it lays upon two questions in regard to the organisms. One is the use of the curette and the other is the use of alcohol. I believe a great deal of damage is done by the curette. The worst cases of sepsis, those cases that die as the result of the infection, are those due to infection in which the curette would do no good whatever, but damage. The streptococcic infection passes quickly through the uterine wall and into the circulation. If we have a streptococcic infection and attempt to use the curette we will find almost invariably that the cases get worse immediately, because of the breaking down of the encystic barrier, the natural protective barrier. The organisms enter the circulation. I believe we would be better off if we never had a curette in the obstetrical bag. Another cause that does damage, and stress was not laid upon it, is the douche. If you want the douche given, give it yourself. How many times have you found that the douche has been given by a neighbor or some one who borrowed a syringe from a neighbor who had an infection, gonorrhoeal or otherwise. It is impossible to tell what kind of water or syringe has been used or what care was taken in the introduction of the douche nozzle. So that if a douche is indicated I either give it myself or have the nurse give it under my own direction.

Another thing that has deceived many physicians and still does, is the absence of an odor. Many times a physician will be called in consultation and he will expect from the course of the temperature that the parturient woman has typhoid or malaria. He thinks it is not an infection because there is no odor. I am always glad to get a case, if I am called in consultation, that has an odor, because they are the favorable cases. The cases that go on with chill and continued temperature and sweats, and that awful picture of impending death we see, are the cases where there is no odor. The lochia

is somewhat decreased, yet the pads are as inoffensive as those of a woman not sick at all. There may be no tenderness even over the uterus, and yet the patient goes on to death. So we must be on the lookout for these cases without odor. In the treatment I believe that sepsis of any kind is the most positive indication for alcohol.

Dr. Moses Thorner, of Indianapolis: The keynote in the treatment of puerperal infection lies chiefly in its prevention. Prophylaxis has proven of far greater worth than has the cure in these cases. The one condition that is the underlying essential of prophylaxis is asepsis. Surgical cleanliness needs no discussion by me. Yet from the amount of unclean methods that are still in vogue, it would certainly seem that one can not cease harping upon even a hackneyed subject.

The time of childbirth should be given the topmost rung of asepsis—if asepsis allows of qualification. Nevertheless, how often in private practice are the methods of modern surgery grossly omitted. Are we sufficiently careful of our environment—I mean, even where care can be given the bed clothes, the patients' clothing—how often do we endeavor to maintain strict asepsis here? And what surgeon would think of doing a clean perineal operation without thorough shaving of the parts? Yet how often is shaving of the pudendum, vulva and perineum, done or even insisted upon—what greater source of contamination can we experience than the hair this region affords.

The patient being well prepared, of course the operator, instruments and assistant are equally so, but is he as careful to maintain that cleanliness through each and every stage of labor, and confinement if possible?

Where vaginal douching becomes necessary it should not be left in the hands of other than those trained in asepsis.

Where purulent discharges exist prior to confinement, appropriate and systematic douching should be done—the bactericidal properties of the vaginal secretions are not sufficient in such cases.

Besides it has occurred to me that in the light of the present opsonic work in gonorrhea, where such complicates pregnancy, the gonococcic vaccine could be used before confinement, to produce an antitoxin, may be even curing the gonorrhoea.

The immediate and careful repair of lacerations of the perineum, vagina or cerin (where the latter are of sufficient depth), using the

same precautions as if it were a later procedure, is another prevention measure.

The fact should not be lost sight of, that injuries such as the above mentioned lacerations, may be the site of remote septic invasion, when we remember that the lymphatic chains of the inferiors, middle or superior portions of the vagina anastomose freely, while those of the upper portion anastomose freely with the cervical lymphatics, which in turn anastomose abundantly with the corpus.

Nor is it difficult to understand how parametrial, tubal and ovarian infection may occur not by contiguity alone, but as extensions along the lymphatics of the uterus, which freely anastomose with the collecting trunks of these organs.

I recall operating upon a patient and liberating a large quantity of pus situated beneath the diaphragm on the left side, occurring as an extension upward of a puerperal peri-metrial infection through the collecting lymphatic trunks, which enter the thoracic duct at about the level of the hilum of the kidney.

In general the use of the antistreptococcic serum (streptolytic serum) in severe puerperal infections has not proven satisfactory. From my own experience and from those cases in which I have seen it administered, I have never witnessed a successful issue in its use. Dr. McKee, of the Chicago Memorial Institute, I understand, has had a series of cases in which its use has proven successful. In the light, however, of even meager success, the use of this serum should be encouraged to combat a fearful foe.

OPERATIVE TREATMENT.

Curettage alone, of the uterus, with the *sharp* curette (I mean, of course, after all placental tissue or membranes have come away), theoretically, and this is generally borne out in practice, is of little avail; for if the infection is superficial, we can and do only open many closed channels, and engulf an already overburdened system with toxines and bacteria. And if the infection is deep, we never reach it. On the other hand, treating the uterus as an infected wound, the dull curette used with gentleness and care, may remove necrotic, infected tissue, and with continuous irrigation, help to remove as much as possible of such infected tissue.

I am assuming all the while, that the infection has not extended

beyond the uterus. Of course if such is the case, we can only hope for focalization and subsequent evacuation of the pus.

The late William Pryor thoroughly curetted such infected uteri, but immediately thoroughly packed them with ten per cent. iodoform gauze, at the same time opening through the vaginal vault into the cul de sac of Douglas, and inserting an iodoform packing here, renewing the packing in the uterus if needed, after forty-eight hours, but allowing the pelvic packing to remain for five or six days.

Dr. Geo. B. Lake, of Wolcottville: Concerning surgical cleanliness in obstetrics, of course there is absolutely no question among any of us that that is the desideratum to be looked for. In the hospital such a thing is possible. It is in a few cases in general practice, but I think that most of us in general practice know that the surgical cleansing of the patient in most cases is an impossibility. In the first place, the physician in country practice does not see the patient until the labor is begun, and many would object to shaving the parts. In my opinion the reason that four-fifths of the women confined under the conditions as we see them do not have puerperal sepsis is because they are immune to their own bacteria. According to the opsonic theory a man does not get any benefits from anybody's bacteria but his own, and possibly there may be a connection there. If the attending physician sees to it that he personally is in a state of surgical cleanliness so that he does not introduce any of his bacteria the woman will do well, and I believe will escape puerperal septicaemia.

Dr. Wright: What does the title of this paper mean? It means that a pyogenic process starts. Pyogenic processes are very similar all the way through. The minute these pyogenic germs enter the organisms they are taken up by the lymph channels. They get away from the point of infection, and the mistake is that too many practitioners confine their efforts to the place of infection—to remove something that can not be removed.

Now the chances for the woman's life depends upon her vitality, her opsonic index, as we may call it. You may take whatever local measures you want to, but unless you control the process by some other means than local measures, unless the index is high enough to control it, the woman dies. Therefore it seems to me we should try to cure the disease by getting at the infection in a general way,

by attacking the pyogenic infection in the lymph channels. There has been a little discussion on that feature, but it has been limited. A woman profoundly infected by any pus organisms is in a condition of shock. Therefore measures that produce hemorrhage, such as opening the posterior cul de sac, or even giving an anesthetic, depress that woman's vitality. The opposite means should be used; raise the vitality. If by serums, do it that way; if by normal saline injections, do it that way; if by quinine and whisky, do it that way. That is the object in view, to make the condition of vitality such that she can oppose the pyogenic organism.

Dr. L. G. Bowers, of Richmond: I think one of the greatest drawbacks to maintaining a proper technique in obstetric cases is that they see other cases delivered without any precautions at all and with no untoward symptoms, and consequently they say there is no benefit to be derived from a good technique. I think what we should have is a reasonable technique, one that we can follow out in almost all cases. We find when we attend obstetric cases that the sheets have not been changed; they have not been washed; they have not used sterile water or the water has not been clean. I believe in all these cases where we are engaged in advance these things should be encouraged among our patients. They can have a clean sheet which can be folded and placed under them; they can have a clean sheet to place over them at the time of the examination; they can be washed with soap and water. Then in your own preparation you can scrub your hands and use some solution. But it is probably best to use gloves. I believe there are not over three to five per cent. of physicians who use rubber gloves in making an examination. The rubber glove can be boiled and wrapped in a towel or dropped into a bichloride solution, and you can go off and attend some other patients and it is ready when you come back, so that you can make reasonably sterile examinations. As to douching the patient prior to delivery, I believe the douche should be taken a month before; not immediately before delivery. I believe with the doctor who spoke here that they have an immunity to their own infection, if we do not introduce some from without. A great many times the infection is from sewing up a laceration. I believe you can do better work in sewing up a laceration by putting them upon a table where you get a good light, and if we would take time and not be afraid to expose the patient we would do better work.

TRANSACTIONS OF THE

Indiana State Medical Association

FORTY-THIRD ANNUAL MEETING

AT

Indianapolis, Indiana, May 22, 23, and 24, 1907

MINUTES.

FIRST DAY.

Morning Session.

The annual meeting of the Indiana State Medical Association convened in the German House, Indianapolis, Wednesday, May 22, 1907, at 9 o'clock a. m. with the president, Dr. Geo. J. Cook, of Indianapolis, in the chair.

Rev. Joseph F. Weber pronounced an invocation, after which First Vice-President J. B. Garber, of Dunkirk, introduced the president, who delivered his annual address. The address appears in another part of this book.

The scientific program of the meeting was then taken up, and the reading of papers and their discussion occupied the rest of the morning session.

Afternoon Session.

The first part of the afternoon session was taken up with the meeting of the House of Delegates. The meeting was called to order by the president at 2 o'clock.

The secretary, Dr. F. C. Heath, made his report.

In the absence of the treasurer, Dr. Bulson, Dr. Heath read the report of the treasurer.

There was no report from the council.

Dr. Heath, member ex officio of the Committee on Scientific Work, made a brief report.

The Committee on Public Policy and Legislation stated that their report would be included in the report on state medicine.

There was no report from the Committee on Pathology.

Committee on Inebriety, Dr. L. D. Dillman, of Connersville, made its report.

Dr. Sterne included in a motion for the adoption of the report a provision that the society approve the bill passed by the legislature, and that members should report instances to the authorities wherein they know of flagrant violations of the law. The motion carried.

The Committee on Necrology, Dr. G. W. H. Kemper, of Muncie, made its report.

Report of Committee on Medical Education, Dr. L. F. Page, chairman, was on motion indorsed and referred to the publication committee.

Dr. J. N. Hurty, chairman, then read the report of the Committee on State Medicine and Hygiene.

Dr. Theo. Potter then read the report of the Committee on Tuberculosis.

The report of the Committee on Prevention of Venereal Diseases, Dr. C. E. Barnett, of Fort Wayne, was submitted.

Dr. Spohn, of the Committee on Permanent Button for the Society, stated that the matter of a design for a button had been allowed to rest on account of the objection of the officials of the A. M. A. in the matter of including the design of the button of the A. M. A., which is patented. The report was received and the committee discharged.

As to the place of next meeting the secretary, Dr. Heath, read a communication from the Vigo county society asking that the meeting come to Terre Haute. Dr. Geo. D. Kahlo invited the society to French Lick. A ballot resulted in the selection of Terre Haute. At the subsequent meeting of the House of Delegates

Friday morning, on account of probable lack of hotel accommodations at Terre Haute, the question of place of meeting was reconsidered, and Bloomington and French Lick were named. The ballot resulted in the selection of French Lick as the place of next meeting.

It was then voted that the time of next meeting be left to the committee on arrangements to be appointed for the coming year, and that the committee arrange also for a two days' session instead of three days.

The secretary read a communication from the Fort Wayne Medical Society in regard to a paper on medical economics. On motion the Fort Wayne Medical Society was requested to furnish a paper along the line of their own request.

Communications from the Fountain County Society, with resolution passed by that society, and from the A. M. A. in regard to minimum fee for insurance examinations were read.

Dr. Kemper moved that the matter be laid on the table. This motion lost. After a motion for the adoption of the resolutions and communications as the sense of the society had been made, Dr. Keiper moved that a committee be appointed to report a resolution, and Dr. Dinsmore, Dr. Blinks and Dr. Dillman were appointed on such committee with instructions to report Friday morning.

On motion it was determined that papers read by title when their authors were not present should not be published in the transactions.

Dr. Wynn introduced the following amendment to the by-laws: That the first discussion of a paper be granted ten minutes instead of five.

The amendment was laid on the table for one day according to the provisions of the constitution.

Evening Session.

At the evening session, which was open to the general public, a symposium of four papers on tuberculosis, with the discussion following, occupied the meeting until adjournment at 10:30.

SECOND DAY.

MORNING SESSION.

May 23, 1907.

On Thursday the meeting was divided into medical and surgical sections, and the whole day was occupied with the scientific program.

THIRD DAY.

MORNING SESSION.

May 24, 1907.

The last session of the meeting was called to order by the president with the House of Delegates in session. The first business announced was the election of officers for the ensuing year. The result was as follows:

For President—Dr. D. C. Peyton, Jeffersonville.
First Vice-President—Dr. W. H. Stemm, of North Vernon.
Second Vice-President—Dr. A. Knoefel, of Linton.
Third Vice-President—Dr. Geo. R. Green, of Muncie.
Secretary—Dr. F. C. Heath, Indianapolis.
Treasurer—Dr. A. E. Bulson, Jr., Fort Wayne.
Dr. W. N. Wishard was elected member of the A. M. A. House of Delegates.

Dr. Whitesides, of Johnson county, and Dr. John T. Dickes, of Portland, were nominated as delegates to the A. M. A. On motion it was determined that the one receiving the smaller number of votes should be the alternate of Dr. Hayden, and the one receiving the larger number of votes was to be the delegate. Dr. Whitesides received thirty-two votes and Dr. Dickes nineteen. Dr. Whitesides was declared delegate and Dr. Dickes alternate.

On motion of Dr. Walker the officers of the society were authorized to appoint alternates if necessary.

On motion the selection of councilors made by the different districts were declared elected by the House of Delegates. The selections were as follows:

Third district, W. J. Leach, New Albany.
Sixth district, D. W. Stevenson, Richmond.
Ninth district, Geo. Rowland, Covington.
Twelfth district, A. E. Bulson, Jr., Fort Wayne.

On motion of a delegate from the Vigo county society the question of the place of next meeting was reconsidered as stated previously, and French Lick was selected as the place of next meeting.

Dr. Keiper moved that the President appoint a committee to consider the question of establishing a state journal in which the proceedings of the association should be printed instead of in a single volume, as at present.

Dr. Bulson raised the point of order that neither the president nor the House of Delegates had authority to appoint such a committee, but that a motion would be in order. It should come before the council. Dr. Wishard stated that the council had had this matter under consideration, and for that reason moved that the resolution be postponed indefinitely, afterward changing it so as to refer the matter to the council, where it belongs.

Dr. Keiper then made the following motion: "That the council shall take such steps as they may deem wise toward the creation of a monthly medical journal as the organ of this state society to take the place of the present transactions; that this be the recommendation of the House of Delegates to the council, to report next year."

The motion was seconded and carried.

The special committee appointed to report on minimum fee for insurance examinations made the following report:

Whereas, Many of the life insurance companies have notified their medical examiners of reduction of examining fee from $5.00 to $3.00; and

Whereas, We as physicians, realizing the responsibility incident to proper examination of the individual, believe such reduction to be unjust; therefore, be it

Resolved, That it is the sense of this society that hereafter, in each examination for life insurance, in which urine analysis is required, the minimum fee shall be $5.00.

Resolved, That the several component societies forming the Indiana State Medical Association, be requested to adopt these resolutions.

Your committee unanimously recommend the adoption of this resolution by the Indiana State Medical Association.

W. H. DINSMORE,
E. G. BLINKS,
L. D. DILLMAN.

Chairman Dinsmore moved the adoption of the resolution contained in the report. Carried.

The amendment to the by-laws proposed by Dr. Wynn in regard to time limit in discussions was adopted.

On motion of Dr. Sharp an adjournment of two minutes was had to allow the delegates to report on councilors.

The president read a communication in regard to the appointment of a delegate from Indiana to the meeting of the national council to be held in Washington. The president suggested the establishment of a permanent committee for this legislative council.

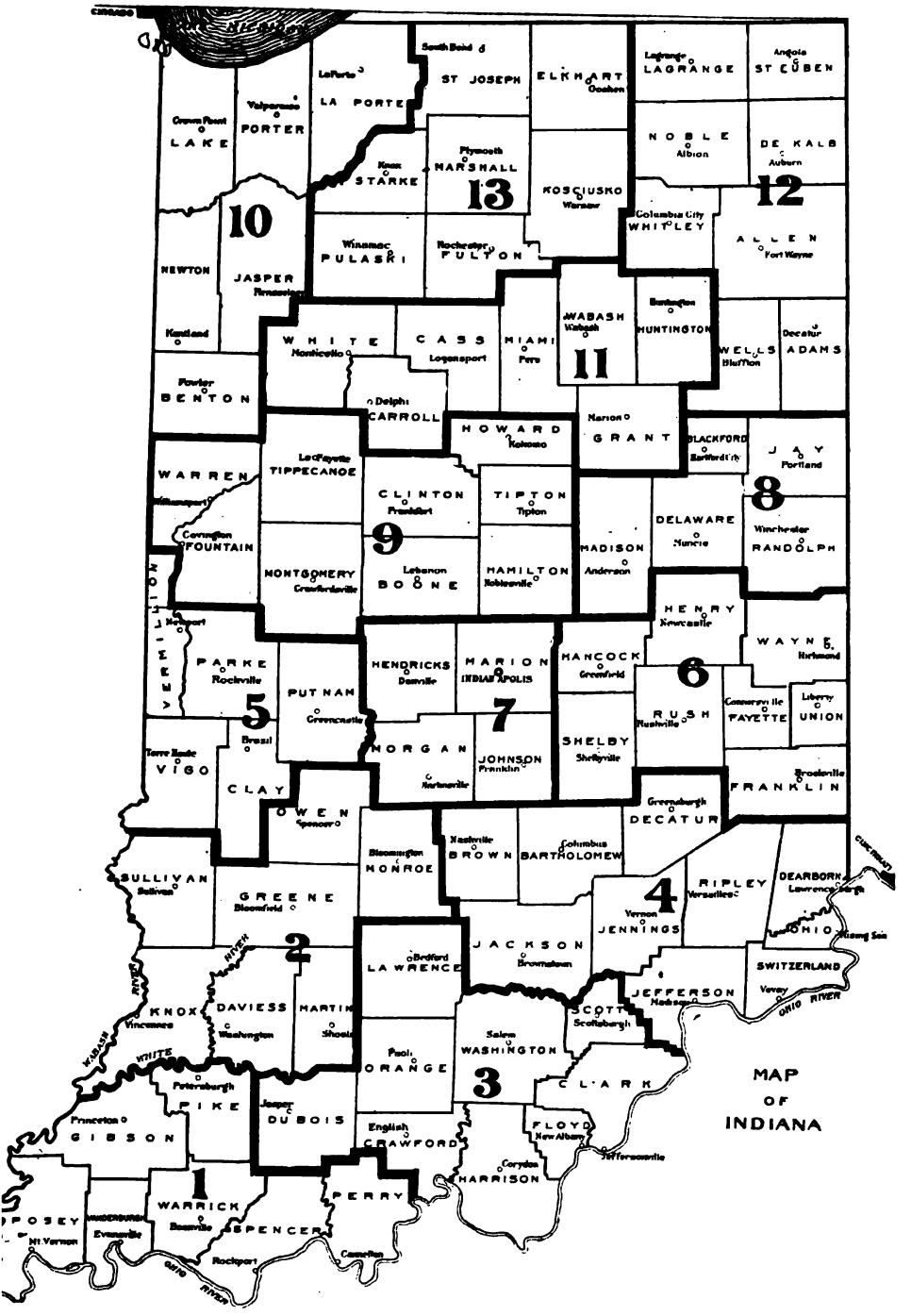
Dr. Wishard moved to establish a permanent committee to represent the state society in the national legislative council. Carried.

On motion the councilors named by the county delegates and previously given in the minutes were declared elected members of the council of the state society.

The scientific program was then taken up and completed.

The president called attention to the fact that the attendance was the largest in the history of the society, showing the interest of the county societies in the central body.

Dr. Cook then appointed Dr. Bruner and Dr. Perce to escort the newly elected president, Dr. D. C. Peyton, of Jeffersonville, to the chair. After a few remarks by the president, thanking the society for the honor and asking the assistance of all the members in the work of the society, the meeting adjourned.



[30] THE COUNCILOR DISTRICTS.

REPORT OF TREASURER

Mr. President and Members of the House of Delegates:

Your Treasurer respectfully submits the following report for the year ending May 21, 1907:

Albert E. Bulson, Jr., Treasurer, in account with the Indiana State Medical Association for the year ending May 21, 1907:

DEBIT.

1906.		
May 22.	To cash on hand	$211 76
May 25.	To cash from Secretary, dues collected	2,109 00
Dec. 28.	To cash from Secretary, dues collected	188 00
		$2,508 76

CREDIT.

By cash to Secretary, honorarium and incidental expenses	$323 50
By cash to chairman of Committee on Publication, honorarium	100 00
By cash to chairman Committee on Necrology	13 00
By cash to J. B. Champion, stenographer, 1906 meeting	80 00
By cash to Ella S. Green, stenographer, 1906 meeting	45 00
By cash to Sentinel Printing Co., printing	39 00
By cash to Jos. Ratti, envelopes	6 00
By cash to S. H. East, typewriting and addressing and mailing circulars	57 90
By cash to Councilors, expenses	121 40
By cash to Adams Express Co	1 20
By cash to Wm. B. Burford, transactions of 1906	1,336 58
Total	$2,123 58
Balance on hand	385 18
	$2,508 18

Your Treasurer has on hand the unpaid bills for expenses incurred during the year, amounting to approximately $250.00, which upon approval will be paid, leaving a balance of approximately $135.00 in the treasury, with all indebtedness of the Association paid.

Respectfully submitted,
ALBERT E. BULSON, JR.,
Treasurer.

Approved:
C. A. DAUGHERTY.
E. G. BLINKS.
D. W. STEVENSON.

SECRETARY'S REPORT.

The total paid membership of our Association for 1907 is 2,385, a gain of 88 over last year. Crawford County Medical Society has failed to report. Benton County Society has reorganized, but so far has only sent in dues for four members. Parke County, which failed to report last year, has also reorganized with twenty-four members.

It is believed that our County Societies can do much better work by pursuing a regular course of subjects like a post-graduate course. Something of this kind is soon to be started in the American Medical Association and our societies can take the subjects recommended by the A. M. A. Committee or select their own subjects. Divisions of these subjects should be assigned to different members for each meeting. It would be well, thus, to work up the local talent regularly, at times varying the course by inviting from other places men known to be particularly well versed in certain lines.

The Secretary of the State Association will be glad to act as a medium for obtaining such persons for the county societies, either trying to supply the men asked for or suggesting and obtaining the kind of teachers desired.

The usual bills are on the Secretary's desk. They are about the same as last year. A change has been made in the case of the stenographer, the Association engaging Dr. Champion to do all the work for $125, out of which he pays his assistant.

F. C. HEATH, Secretary.

REPORT OF COMMITTEE ON MEDICAL EDUCATION

LAFAYETTE PAGE, M. D., OF INDIANAPOLIS, CHAIRMAN.

Mr. President and Delegates of the Indiana State Medical Society:

Your Committee on Medical Education, consisting of Drs. Edwin Walker, of Evansville; J. B. Berteling, of South Bend, and L. F. Page, of Indianapolis, desires to submit the following report:

It is urged by this committee that a discussion of the conditions and progress of medical education in this state become a feature of these annual meetings. The advice and co-operation of this Society in molding public sentiment, and opinion, and fostering medical progress, would be of inestimable value to the cause. If we could lay aside personal ambitions, and our profession present a solid phalanx in securing better laws, higher standards, and an ideal institution of learning under State control, Indiana would soon take the place she deserves in the front ranks of medical progress. With all the elements within our State borders necessary to constitute an institution the equal of any in the world, we must wait the slow process of evolution, until it finally dawns, that opposition to real progress is useless. Let us hope that selfishness may soon be eliminated from the struggle, and that only those who have the true cause of medical education at heart may triumph. Therefore, it is urged that this Society, without partisanship and without favor, take an active part in determining what is right and best for our profession and the citizens of this State in securing better laws, higher standards and a model institution of medical education under State control.

The Council on Medical Education of the American Medical Association has done valuable work during the past year in securing data as to the existing conditions of medical education in this country, and is bringing about many needed reforms.

Probably the most important work undertaken by that body during the past year has been the personal inspection of the medical schools of the United States to ascertain the exact character of their work and the attempt to classify these schools and mark them on a civil service basis. This was a large and onerous task; the country was divided into sections and the 160 schools visited by some member of the council or by the secretary. The conditions as summed up by Dr. Bevan, the president, should be read and studied by every physician interested in the progress of medicine in this country.

This report shows that there are 160 medical colleges in the United States, about as many as there are in Great Britain, Germany, France and Austria combined. The schools in this country represent all grades, from the very highest, as high probably as those of any country in the world,

to the very lowest, a number being little better than diploma mills. This inspection showed many schools to be absolutely worthless, without any equipment for laboratory teaching, without any dispensaries, without hospital facilities; some which are no better equipped to teach medicine than is a Turkish bath establishment or a barber shop. These 160 schools have all been graded and classified according to civil service methods, and will be inspected annually by representatives of the council.

The most important fact brought out in this inspection is this: In this country we need money for medical education. It costs more to educate a medical student than he can pay in the way of fees. Medical education must secure state aid and private endowment.

Every state university now in existence, or established later, should have a strong, liberally-supported medical department. No better investment can be made by any state than the establishment and support of such a medical department. Such a department should be in the largest center of population in the state, and in close touch with the various departments of the State Board of Medical Registration and Examination.

The public must be taught the necessities and the possibilities of modern medicine, and philanthropists shown that medicine well deserves the same support that has been given to theology, to colleges of liberal arts, to libraries, etc. Philanthropists will not endow medical schools which are private corporations and conducted for profit.

1906—RECIPROCITY.

During 1906 Indiana lost 23 men to eight states by reciprocal endorsement, and gained 21 from nine states.

EXAMINATION.

School of medicine.	Number of candidates.	Average grade.
Indiana Medical College	119	872.2
Physio-Medical College of Indiana	6	884.7
Eclectic Medical College of Indiana	6	810.5
Schools outside state	119	861

NECROLOGY.

During 1906 136 physicians in Indiana died. Of these 28 were not graduates.

LEGISLATION.

Several bills were introduced during the last session, but all failed of passage. One was introduced by Senator Farber at the request of the Board. Senator Cavins introduced one providing for oral examination in case of physical disability, and Senator Kittinger's bill provided that a physician whose license had been revoked may practice pending appeal.

CHANGES IN MINIMUM REQUIREMENTS.

(a). A. B. and B. S. degrees do not give advanced standing unless documentary evidence shows that applicant has completed all the work of the medical freshman year.

(b) No matriculation is considered valid that antedates actual college attendance more than ten days.

(c) Colleges are required to publish a full and comprehensive description of their laboratories, together with specific statement in detail of the equipment and facilities of each.

The greatest movement at the present time for the advancement of medical standards is for the adoption of the year in physics, chemistry, biology and languages, in addition to a four-year high school education, as a preliminary requirement for the study of medicine.

SYNOPSIS OF SENATE BILL NO. 263.

Section 1 provides that certificates issued by the State Board of Medical Registration and Examination must be registered only in the county in which applicant is a bona fide resident. This is to prevent the traveling doctor from registering in every county to which he goes, and to prevent possible transfer of license for fraudulent purposes.

Sec. 2 would enable the board to know at once whenever a doctor transfers his license from one county to another, inasmuch as the county clerk would be required to return the old license, marked "surrendered." If there has been fraud in obtaining the license it can be revoked at once. Several fraudulent licenses were issued by county clerks last year, and when the board learned of the error, in the January following, the owners of the licenses had departed for parts unknown.

Sec. 3 would allow the board to pay its clerk, out of its own fund and no other, not more than $1,000. The law as now framed allows only $500. The board finds it difficult to retain competent assistants for the present salary. This salary is the lowest paid in the State House. The floor scrubbers get $720 a year.

Sec. 4 provides that any physician who undertakes to practice without first securing a license may be enjoined from practicing until he obtains a license as required by law. Charlatans and quacks, driven from other states, come here and begin the practice of medicine. The board proceeds to prosecute, and the offender is fined, usually the minimum of $25. He pays the fine and goes on practicing, and on account of limited means it is impossible to continue the prosecution, and execute the law as it should be executed.

Sec. 5 provides that physicians shall not publish or print false, fraudulent or misleading advertisements for the purpose of securing patronage. Every man who believes in honorable medicine favors this amendment. However, the quacks and newspaper men made themselves heard and the whole bill was killed.

REPORT OF COMMITTEE ON STATE MEDICINE AND HYGIENE

BY JOHN N. HURTY, M. D., INDIANAPOLIS, CHAIRMAN.

STATE MEDICINE.

To the House of Delegates—Gentlemen:

Laws: The Sixty-fifth General Assembly, in session in January and February, 1907, passed laws touching state medicine at several points. No amendments were made to the medical or dental laws. The health law, the pharmacy law and the nurses' laws were amended, as reviewed below.

The Free Antitoxin Act: This important act provides free antitoxin at public expense for all families too poor to pay for the same. To secure free antitoxin the physician must fill out a blank, furnished by the State Board of Health, which blank calls for the name of the patient, name of parents, address, number of units wanted, date, etc.

The physician must also sign an affirmation that he will use the remedy in the case named and must furnish certain data to the health authorities. When properly filled out in ink, said blank becomes a voucher to any dealer in antitoxin, who can collect the market price of the antitoxin furnished from the city, town or county as the case may be.

This law was written by the State Board of Health at the suggestion of Dr. J. Frank Simison, representative from Tippecanoe and Montgomery counties, and to him belongs also the credit of introducing and securing its passage.

Amendments to Pharmacy Act: The first pharmacy law was enacted in 1899. The present amendments make a bipartisan board, permits the board to establish and maintain a laboratory for practical examinations; gives power to conduct prosecutions for violation of the act; more clearly defines the requirements for registered pharmacist and for registered pharmacist assistant; provides higher fees, which was found necessary by experience with the law, and permits the sale of patent medicines by general merchants.

Registration Law: As the registration law of 1899, under which the State Board of Health has collected accurate mortality statistics since 1900, did not provide for the accurate collection of births, marriages and infectious diseases, it was necessary in the order of progress to secure a new law. Accordingly the State Board of Health, with the aid of the Attorney-General, drew up a bill, which was duly passed. Under this law physicians shall immediately report deaths as heretofore, shall immediately report infectious diseases named in the rules of the State Board,

and shall report births within twenty days after their occurrence. In the event no physician is present or acting as family physician when a death or birth occurs, then the same shall be reported by the householder. Or shall be reported, in the case of a birth, by the midwife, if one is present. Still-births of seven months' gestation and over shall be reported as both deaths and births, and all still-births under seven months' gestation shall be reported simply as still-births.

Failure to make reports is punishable for the first offense with a fine in any sum not less than ten or more than fifty dollars; for the second offense not less than fifty nor more than one hundred dollars, and for a third offense the fine is one hundred dollars.

A new feature in registration in Indiana is the requirement that all persons authorized to perform marriages shall report all marriages performed by them within three days to the clerk of the circuit court of the county wherein performed. The state board is given power to pass rules for the detailed enforcement of the act, the violation of the same being punishable as for the violation of the act itself. As the supreme court has held that the legislature has power to compel these reports without giving compensation, and has also held that the rules of the state board concerning health affairs and registration have all the force of law, these questions will not be raised.

Law Concerning Nurses: A single amendment was made to the act concerning the registration of nurses. After January 1, 1908, the applicant shall furnish satisfactory evidence that he or she is twenty-one years of age, of good moral character, has received the equivalent of a common school education, and has been graduated from a training school for nurses connected with a general hospital approved by the board, where a systematic course of two years is given.

Indianapolis Board of Health: An encouraging fact is found in the amendment to the health law relating to cities of the first class, which term means Indianapolis. This amendment takes the city board of health out of politics. It now consists of four members, no more than two to be of the same party, and all to serve four years. The secretary must give his entire time to the duties of his office, his pay not to exceed $3,000 annually, to be fixed by the board, and removable for cause at any time. The secretary serves until successor is appointed. Very considerable powers and duties are given the board and the secretary, and proper appropriations and public support now seem to be all that is necessary to put Indianapolis on the highest hygienic level.

Hospital for Treatment of Tuberculosis: A matter for hearty congratulation to the state is the law establishing a state hospital for treatment of tuberculosis. It may truthfully be said that the credit for this onward and upward movement in Indiana is largely due to the agitation and able advocacy of the Indiana Medical Society.

The law creates a commission of five appointed by the governor and is empowered to purchase 500 acres of land, for which $30,000 was appropriated. The said commission is also empowered, when an appropria-

tion is made therefor, to select plans, construct and equip the institution. A final board of trustees is to be appointed by the governor to conduct the hospital when finished and turned over to the state.

The trustees shall elect a competent superintendent who shall appoint and employ all other officers, physicians, agents and employees. Only residents of this state may be admitted and the preference shall be given to the indigent and incipient cases. Admission shall be secured through the trustees of townships, and if not wholly indigent, patient must pay what he is able to pay.

Trustees are empowered to pay for the care of indigents to the extent of $5.00 per week, and said cost to come from the county treasury. The board of trustees shall make proper apportionment for the counties, the same to be as equitable as possible.

Provisions are made for special pay patients who are able to pay part or the whole of the cost of care and treatment. The balance due from the partially indigent shall be paid by their counties.

It is only after all indigent and partially indigent applicants are provided for that full pay patients may be admitted.

Early in May the governor appointed the commission authorized by this act as follows: J. N. Babcock, Topeka, farmer; Henry Moore, M. D., Indianapolis; Benj. F. Bennett, Greensburg, attorney; Isaac R. Strouse, Rockville, editor; W. S. Holman, Aurora, attorney.

These are all good men, citizens of the highest class, and the governor does well to select men from different professions and walks of life. It may be true that not one of them is particularly informed in the work he is to do, but all can be informed, and will be, and a distinct advantage lies in the fact that good men from different parts of the state will through their duties become interested and interest others in antituberculous work, which is the greatest economic and humanitarian question of the day.

The Sterilization Law: This is an act to prevent procreation by confirmed criminals, idiots, imbeciles and rapists. It provides that the authorities of prisons, and all institutions intrusted with the care of confirmed criminals, idiots, rapists and imbeciles, to appoint upon its staff, in addition to the regular institutional physician, two skilled surgeons of recognized ability, whose duty it shall be, in connection with the chief physician of the institution, to examine the mental and physical condition of such inmates as are recommended by the institutional physician and board of managers. If the examination leads to the conclusion that procreation is inadvisable it shall be lawful for the surgeons to perform such operation for the prevention of procreation as shall be decided safest and most effective.

This law is in accord with our best knowledge, and with the scientific handling of such problems. It marks a distinct advance in the effort to improve the race. To Dr. Horace G. Read, representative from Hamilton and Tipton counties, belongs the credit of getting this excellent law through the legislature.

To Dr. Harry Sharp, surgeon of the Indiana Reformatory, belongs

the credit for the pioneer work always necessary to accomplish great works.

The Pure Food and Drug Law: This law was written and presented by the State Board of Health. The first food law was presented by the State Board in 1897, but failed. In 1899 it passed without an appropriation and laboratory for enforcement. In 1901 the act proposed for its enforcement failed, and also again in 1903. In 1905 a laboratory was given to the State Board of Health, and an appropriation of $10,000 for pathological, bacteriological and pure food and drug work. Through experience in enforcing the pure food and drug law of 1899 it was found defective in a few points, and so a new law correcting said defects and extending scope and powers was presented to the last legislature. It passed and an appropriation of $15,000 was given for its enforcement. Although ten years may seem a long time in which to secure a law plainly needed for the protection of the people, still it is not discouraging, for conglomerate law-making bodies can not immediately seize upon and enact into law all ideas essential to progress. The present law is along the lines of the national pure food and drug law, which itself is very much of the essence and character of Indiana's law of 1899.

Marriage Law: A law not nearly nor yet remotely connected with state medicine is that passed in 1905 making the marriage unlawful of those suffering from syphilis, gonnorrhoea and tuberculosis, and also of idiots, confirmed criminals, the insane and confirmed paupers. Now the legislature of 1907 makes it unlawful for first cousins to marry, and legalizes all such marriages heretofore made.

Wash Rooms in Factories and Mines: A law requiring the providing of properly furnished and ventilated wash rooms in factories and mines certainly pertains to state medicine. Such law, passed by the last assembly, makes it the duty of all collieries or other places where laborers are employed, at the request in writing of twenty or more employes, or in event of less than twenty being employed, then upon the written request of one-third, to provide a suitable wash room or wash house. The said wash room to be separate from any engine or boiling room and to be kept in good condition.

Optometry Law: This law creates a board known as the "Indiana State Board of Registration and Examination of Optometry." Optometry is defined as: "The employment of mechanical means for testing and measuring the refractive and accommodative conditions of the eye without the employment of drugs or medicines, and the measuring and grinding of lenses, the fitting, bending and adjusting of spectacles and eye glasses with lenses for the betterment of vision."

The board, to be appointed by the governor, consists of five members, four to be resident opticians of experience and the fifth a resident oculist of experience. The expenses of examination and registration are to be paid by fees collected from applicants, although it is the argument that the board is for the protection of the people, a police measure. Itinerant venders of spectacles are exempt from the requirements of the law, which.

of course, is a ridiculous provision, as it lets out the very class which most needs to be controlled.

Summary: The statutes here reviewed and passed by the 65th Indiana General Assembly, pertain wholly or in part to state medicine. All are beneficient and timely and the credit of their conception and passage belongs almost entirely to the medical profession of the State.

CASES AND JUDGMENTS.

Cases of action under the medical, dental, pharmacy and health laws have not been few since the last report of this committee, but most of said cases were of minor importance, where fines were assessed for violation, and only in one instance was the decision of sufficient importance for record here.

In this instance Judge Carter, of the Marion Circuit Court, decided that the State Board of Registration and Examination had the power to make a rule requiring all applicants for registration to first graduate from a recognized medical school having a four-year course.

HYGIENE.

Tuberculosis is still epidemic. The year 1906 ended with 4,456 deaths from this cause, or 56 fewer than in 1905, and so it may be said there was a decrease. The public agitation concerning the combat against this disease has been kept up by the county medical societies, by several local anti-tuberculosis societies and by the State Board of Health. The action of the legislature in regard to the matter has been recorded.

It still remains to be repeated, that all too frequently physicians fail to recognize tuberculosis in its early stages. The word should be passed along that it is the solemn duty of the profession not to tire in teaching the people that tuberculosis is not hereditary, that it is curable in its incipiency, and that it is induced by bad living.

Smallpox has prevailed the entire year and every county has been visited. Only eight deaths occurred. The cases must have numbered into the thousands, many so mild they were not recognized as smallpox at the time, but appearing plainly to be so afterward when the disease did not develop upon continued exposure.

The diagnosis of atypical smallpox, very difficult and defying the elect at times, is still frequently missed when not atypical. The local epidemics have caused little damage, only occasionally scaring a community for a short period.

Typhoid fever: The tabulated and analyzed records for the last seven years show that typhoid fever is decreasing. The death rate per 100,000 in 1900 was 52.8 and in 1906 it was 31.9, a decrease of 39 per cent. There have been no epidemics in communities nor outbreaks of typhoid in any of the public institutions as was the case in 1905.

Diphtheria: This disease, well termed the "terror of mothers," is losing its hold. In 1900 the death rate was 19.1 in 100,000, and in 1906 it is

12.8, a decrease of 33 per cent. It is to be presumed that antitoxin has accomplished the most of this good work, for the number of cases seem to be no fewer. To reduce the cases the better co-operation of the medical profession in the matter of reporting is required.

Scarlet Fever: Mortality has decreased in seven years from 5.6 per 100,000 in 1900 to 3.6 in 1906, a decrease of 35 per cent., and this without any antitoxin. No satisfactory explanation is at hand for this excellent result.

Total Mortality: The total death rate in seven years has fallen 1.1. In 1900 the rate was 14.1 per 1,000 and in 1906 it had fallen to 13, a decrease of 1.1. This means a saving in our population annually of over 2,500 lives. May this saving continue.

REPORT OF COMMITTEE ON INEBRIETY.

BY L. D. DILLMAN, M. D., CHAIRMAN, CONNERSVILLE, IND.

To the House of Delegates:

Mr. President and Members of the Society—For a number of years it has been the policy of this society that each succeeding president appoint a committee to report progress in this and other countries in the treatment of inebriates and habitues of drugs, and that recommendations be made by the committee as to the furtherance of any plan suggested for state management of such unfortunates as dwell within our borders.

Your committee for 1907 begs to report that along with the wave of reform found general over the civilized world, we note a growing sentiment that not only the habitues of the use of alcoholic liquors and drugs be better cared for, but that the dealers in the same receive such vigorous management that the public expense incurred in providing for housing and nursing of these maniacs may not appear so enormous; that any State, even our own beloved Indiana, will hesitate in sheltering and finding suitable treatment for the victims of a diseased condition that is both curable and preventable.

Public interference in selling and using these poisons, as well as improved means of caring for helpless victims, is well established in bibulous England.

Germany and France are aroused to the enormity of these evils in the way of advancing civilization as never before. Reform and public management are forthcoming from these countries as to the sale of such agents as threaten the destruction of their institutions, and load an enormous class of helpless people upon the State to be cared for.

In the United States we find several states already providing by each state for drug and alcohol maniacs, and in more than a dozen other states bills have been offered for controlling and housing these depraved creatures, the same as is provided for other cases of insanity.

In our own state, sentiment of the people is evidently gaining in favor of a higher moral standard generally, and along with more stringent laws lately passed regulating the liquor traffic naturally comes a correspondingly better feeling for those suffering from the use of liquor and its allies, opium, cocaine, etc.; so we feel that organized effort by earnest men and women over our country, and even efforts made by my predecessors on this state committee, have borne fruit, and that urgent demands made by future committees before this Society will bring rejoicing to a class that have been considering themselves as almost unworthy of notice, and whom the public has considered troublesome and dangerous to themselves and others, and whose removal from society to avoid offense, or for proper treatment under care of competent specialists, has been to the people "a consummation devoutly to be wished."

Great demands have been made upon the state of Indiana to provide buildings, grounds and treatment for the diseased portion of its populace.

Enlightened civilization has forced these rapidly upon each other in the last few years; but even with the immense burdens imposed upon our taxpayers it would seem, when we consider the appeal, that each victim of alcohol and drugs makes to every sane observer that we can not as a Christian people shrink from our duty in urging our legislators, at the earliest opportunity, to yet place an additional tax upon us to provide means for handling victims of the above-considered poisons.

A hospital for these depraved individuals is the only practical plan yet devised by those who have given the subject the greatest attention. The state of Indiana must positively be urged to provide at the earliest date possible a properly planned hospital, where these helpless ones may find shelter and aid.

At the last meeting of this society, Dr. Green, of Muncie, my predecessor, as chairman of this committee, and at present a worthy member of the same, presented to the society an extended report of what the committee had done, and recommended for the consideration of this society the passage of a bill by the legislature of the state, establishing and maintaining by the state a hospital for inebriates.

A form of bill was drafted and printed in full in the last transactions of this Society. This bill was carefully prepared and several reprints circulated in different parts of the state, and this proposed bill has been referred to the committee on legislation of this Society, and now that the tuberculosis bill needs no further assistance from this Society, it is an opportune time for our committee on legislation to persuade the legislature at its next meeting to take up the bill as presented by Dr. Green, or a similiar one, and urge an enactment of the same, as every physician must agree with Dr. Green that an emergency actually exists.

The management of maniacs from use of drink and drugs is one of the great problems of the future, and we can not falter in our devotion to "ways and means" for its solution.

Philanthropists are spending their millions lavishly on public libraries —a worthy cause, and commendable—but if these same philanthropists could be induced to make a thorough investigation of the conditions found among habitues in use of drugs and alcohol, it would seem that they would be stirred to action, a few of their millions diverted to the treatment of these maniacs, and taxpayers would to a certain extent be relieved in making provisions to aid their "fallen brothers."

Every community generally looks to the physician to take the initiative in these matters, so it behooves each member of the State Medical Society to use his influence with legislators for the enactment of Dr. Green's bill. If passed, the dirty jails and penitentiaries that now house many victims will give them up to more congenial quarters in a hospital and not only will the sufferer be relieved and cured, but taxes for maintaining prisons will be lessened and society will be benefited.

L. D. DILLMAN, Chairman.
GEO. R. GREEN.
H. J. HALL.
M. F. GERRISH.

REPORT OF THE COMMITTEE ON THE PREVENTION OF VENEREAL DISEASES

BY CHARLES BARNETT, M. D., OF FT. WAYNE, CHAIRMAN.

To the House of Delegates:

Gentlemen—On account of the fact that at the last (57th) session of the American Medical Association there were two symposi (1) consisting of eleven American and two foreign papers, in the section of Hygiene and Sanitary Science on Venereal Prophylaxis, leads your Committee on Venereal Disease Prevention to believe that there was never a time in the history of medicine when the magnitude and necessities for work in that direction has been more understood by the medical profession than just now.

Our state has been doing some good work in that direction, but in order to do a better work and more good to mankind it needs a more perfect support from our men who are derelict in their duty. A little from each will work one great total. As a reason for so doing Prince A. Morrow says: "Venereal diseases in their origin, and especially in their far-reaching pathological effect, strike at the very root of race perpetuation. They blight the mental, moral and physical welfare of society as does no other agency. War, pestilence and famine are temporary; venereal diseases constantly ravage all grades of society."

While this definition is far-reaching, it is likely best to review a few plain facts in order to bring the question more prominently before you. Of syphilis, which is less destructive to mankind than gonorrhea, there are said to be 50,000 (Weiss) new cases contracted yearly in New York. Fournier says that one-fourth of all syphilitic women seen by him in private practice had contracted the disease innocently and undeservedly, and three-fourths of the married women acquiring syhilis are inoculated by their husbands. Fortunately, most of their offspring die.

Gonorrhea, which is the prime factor in race suicide from sterile marriages (75 per cent. Vedeler) and one child marriages, furnishes the etiology for most of the gynecologist's work. (Joseph Price, 95 per cent.) The Neisserian coccus is now found practically in all cavities, and in the mucous and synovial membranes of the whole economy. "Once gonorrhea, always gonorrhea," is a saying that seems to be proving itself the more we find its far-reaching foci of infection. A comparison of a preference between smallpox, diphtheritic or gonorrheaic infection today, from a pathologic standpoint, would select smallpox or diphtheria. It is said that 80 per cent. (Weiss and Schwartz) of all men have had gonorrhea at some time in life and that 50 per cent. (Egbert) of all men have gonorrhea before thirty years of age.

"Wine, woman and money are still the three great attractions. Wine and the money powers are being fought diligently today, both by the law and the people. Diseases that are concomitant to the power of women must be fought by the medical profession with truth. The natural instinct of man, be he ever so manly, is to be mannish when the sexual balance is brought to a test. So he makes an easy taskmaster in law infringements pertaining to sexual misconduct.

As to state laws, Albert H. Burr of Chicago, under this subject, "The Guarantee of Safety in the Marriage Contract" (Journal A. M. A., Dec. 8, 1906), attacks our law in the following words:

"A vital defect of the Indiana bill (1905) is its lack of any provision for medical examination. It requires the State Board of Health to furnish a form of application for license to marry (Sec. 2) and denies the license "where either of the contracting parties is afflicted with a transmissible disease" (Sec. 3). "No license to marry shall be issued except on written and verified application" (Sec. 1). So far as the bill goes this verification may be the sworn statement of the applicant, who is incompetent to determine whether he has a "transmissible disease" or not. Clearly this inspection should be thorough and impartial and made by medical officials of the state under efficient modern clinical and laboratory tests when necessary. Only in this way can there be any adequate guarantee of safety in the marriage contract. Our medical education today is fully equal to such demands and could have no more worthy or humane employment."

Dr. Hurty, in reply, says: "The Indiana law is an experiment. The 1905 legislature passed a law that no person afflicted with a transmissible disease (meaning venereal diseases principally) shall be privileged to marry. The question is, how shall it be executed? Of course, penalties attend, and the execution of the law has been left largely to the State Board of Health. The State Board of Health prescribes the questions to be asked every applicant to marry, and licenses must be issued for all marriages. The questions have been formulated and have been in use for over a year. They are not severe, not exacting for the beginning, and the first opposition has subsided. The answer to these questions must be sworn to, and it has been said that the law simply makes more perjury. Dr. Hurty does not believe this is the case any more than happens in giving sworn court testimony. Of course, there is some perjury. In one instance in Indianapolis a marriage was stopped. The young man confessed to the clerk, when he applied for his marriage license, that he had gonorrhea, but that he believed that he was cured, though he did not know. The clerk had the power under such condition to refuse a license. The applicant was examined and was found to be infected, and that marriage was prevented. Of course, there were heartaches, but perhaps not near so great as might have followed the marriage.

It is proposed to go one step further and to have all such cases reported. It will be a difficult matter, but it can be accomplished. Many of these patients go to drug stores and are never seen by physicians, but a great many of them can be recorded, and their names should be properly

classified to guide the clerks who issue marriage licenses. This will not cover the whole field—nothing like it; still, Dr. Hurty contends that it will do some good. This Indiana law designated to prevent the marriage of diseased persons was written by one of the highest judges, and for that reason the people of Indiana are confident that it is constitutional. Dr. Hurty suggested that while studying this important question of personal purity before marriage the medical profession assume a more serious attitude, stop all jokes and all light references to venereal diseases. Let no vulgar stories pollute the lips of the physician."

We especially indorse the proposition to "go one step further," and have, as far as possible, all cases of venereal diseases (without names) reported to the State Board of Health. It can be done.

The following "Facts About Syphilis" and "Facts About Gonorrhea," issued to all the physicians of the state by the State Board of health, we commend most highly. Dr. Hurty says: "Strange to say, some physicians are found who do not think it wise to hand out cards like these."

The warning in these cards will have much weight on account of coming from the state. They can be given to any one, be he diseased or not. In the former it will act as a prophylaxis against his infecting others. In the latter, self-preservation and education to others will be gained. The facts they contain are given simply, truthfully and philosophically, as follows:

FACTS ABOUT SYPHILIS.

Syphilis is not a local disease. It is in the blood. Local remedies and taking medicine for a few months will not cure you. You must take treatment for two or three years. If treatment is neglected, much trouble and suffering may be caused, not only to yourself, but to other members of your family.

Long experience has proven that strict observance of the following rules will hasten your recovery, prevent the spread of the disease, and insure you against insanity, paralysis, or other serious illness, in future years:

Avoid patent medicines, so called "medical institutes," and advertising quacks. Consult your doctor at least once a week for the first three months, and at least once a month for two years. Do not consider yourself cured because the rash has disappeared. Do not indulge in sexual intercourse. Sleep alone. Under no circumstances allow anyone else to use your towels, brushes, combs, razors, shaving brushes, or other toilet articles, and do not use such articles belonging to anyone else. Do not allow anyone else to use any article that has been in your mouth, such as tooth brush, toothpick, cigar, pencil, pipe, fork, spoon, drinking cup, etc. Do not kiss anyone. Brush your teeth night and morning, and keep your mouth clean. If you have bad teeth, have them attended to by a dentist, and be sure to tell him that you have syphilis. Do not marry without the express consent of your physician. You may infect some innocent girl, and make her a lifelong invalid. It is illegal to marry in Indiana if you have syphilis or gonorrhea.

FACTS ABOUT GONORRHEA.

Do not listen to the man who tells you he would rather have gonorrhea than a bad cold. An attack of gonorrhea is a serious thing. The disease has killed hundreds of thousands of persons and blinded as many more. Twenty per cent. of all the inmates of the institution for the blind are there on account of gonorrhea in the father or mother.

Close observance of the following rules will shorten the attack and prevent the spread of the disease:

Avoid patent medicine, so-called "medicinal institutes" and advertising quacks. They are more intereested in your money than in your health.

During the first two weeks, or while the discharge is profuse, keep off your feet as much as possible.

Do not use whisky, beer, wine or alcohol in any form, as it prolongs the disease. Drink plenty of water or milk. Do not use mustard, pepper, horseradish or strong sauces on your food.

Avoid all sexual relations until pronounced cured by your physician, as the disease may be given to another person after the discharge has apparently ceased.

Always wash your hands after handling the diseased parts. The discharge, if carried to the eyes, may cause blindness.

Sleep alone, and allow no one else to use your toilet articles, especially towels and wash cloths.

Never lend your syringe to any one.

Be sure that the bowels move every day.

Do not marry without the express consent of your physician. An old gleety discharge is often just as dangerous as that of an acute attack. You may infect some innocent girl and make her a life-long invalid.

It is illegal to marry in Indiana if you have gonorrhea or syphilis.

Do not get discouraged if you do not get well as quickly as you think you should. A complete cure may require a long time.

On account of the underpaid, non-self-sustaining factory working girls during their period of vulnerability (16-21), at which time they are preyed upon by men who are the very phagocytes of seduction, we suggested to the State Board of Health the issuance of the following circular (a modification of the pamphlet issued by the German Society) to the managers of all our factories in the state for distribution to their working girls:

CIRCULAR FOR WOMEN AND GIRLS.

This circular is addressed particularly to girls who become wage-earners early and have no suitable person to give them advice.

Among the most serious dangers which threaten these girls is the danger of sexual relations outside of marriage, to which they are often led by apparently harmless pleasures, such as dancing, etc.

They should put no trust in the dishonest promises that a man makes to them in order to lead them astray. He loses nothing. They may be disgraced, diseased and in a family way by so doing. They should also

avoid the supposed female friend who wants them to ruin themselves. She is ruined and misery loves company.

For girls sexual relations before marriage have a two-fold danger—the danger of getting into the family way and the danger of sexual diseases.

The girl who is in the family way is hindered in her work. She frequently loses her position. She falls into disgrace and her first thought is to get rid of the baby by getting an abortion produced. An abortion produced not only breaks the law but is murder, and that is not the worst part—it is more dangerous than being confined (ask any honest physician's opinion). A physician who will produce abortion is so low, degraded and filthy that he is willing to risk killing the girl in order to get her money.

Men who seek sexual relations outside of wedlock generally have intercourse with several girls, especially prostitutes. The consequence of this is that nearly all of these men suffer or have suffered from some sexual disease. Any one who has a sexual disease can give it to others, even when he is apparently entirely healthy, and in many cases even when he considers himself entirely cured.

On account of the widespread prevalence of sexual diseases among men, every girl who has sexual intercourse, even once, with a man exposes herself to the danger of contagion. Girls who change their lovers take some sexual disease almost invariably.

The two principal sexual diseases are syphilis and gonorrhea. The latter does far greater harm to the body of the woman than to that of the man. Gonorrhea works its way upward in the female into the interior of the body and causes in some of the lower internal organs severe inflammation and suppuration.

Many operations upon young girls and women that are called by the surgeon appendicitis (to protect the patient from disgrace) are in reality "pus tubes" from gonorrhea. Gonorrhea frequently makes the woman a chronic invalid, permanently disabled for work.

The poison of the disease is liable to get into the eyes of the baby when it is born and make it blind.

Syphilis is a disease that lasts for years, which poisons the whole body and not seldom leads to the severest disfigurements and after-troubles. Still-born children are a frequent consequence of syphilis.

Even when the person affected has no longer any manifestations of the disease it is liable to be transmitted to the offspring and induce in them serious forms of the disease.

Hence the following advice should be taken to heart:

Always be on your guard, so that a single hour under man's influence may not rob you of your honor, your health, your money-making capacity and your life's happiness.

Close your eyes to the persuasions of go-between women. These women profit by your ruin.

If you have once yielded yourself to a man you must always be on the lookout for the injurious consequences that are liable to follow.

Examine your body for a long time afterward with the greatest care. Smarting and itching in the private parts, especially a discharge not noticed before, suggests that you have contracted gonorrhea. Any sore or lump or ulceration suggests infection with syphilis.

On finding these signs, which often do not appear until after three or four weeks, go at once to some doctor (always to an honest, conscientious, learned physician, never to a quack, or one who advertises). If these diseases are treated correctly from the first their course is generally mild. Then and then only, as a rule, can a complete cure be effected.

It is not enough, of course, merely to go and see the doctor. His directions, especially his instructions in regard to the most careful treatment, must be strictly followed in all points. If you have taken a sexual disease, then you must heed the following advice: Until the doctor declares that you are entirely cured all further sexual relations are strictly forbidden. If you act contrary to this rule you lose all claims to sympathy; your behavior is criminal and you are inhuman. You must not get married until the physician has given his consent. Otherwise your husband may take the disease from you, and your children may be diseased. Every girl should try to make sure that her future husband does not suffer from a venereal disease.

If you have had sexual intercourse and yet have not gotten in a family way nor taken a sexual disease, do not let yourself be lulled into security. The warnings of this notice are still binding.

Contagion with syphilis may occur without sexual relations. For instance, a healthy wet-nurse may take the disease from a syphilitic child, a healthy child from a syphilitic wet-nurse. Consequently, before taking a position both wet-nurse and child should be examined by a physician.

Syphilis may also be transmitted by a kiss and by the common use of eating and drinking utensils; gonorrhea by handkerchiefs, bandages, bed linen, sponges, syringes and the like. Consequently, be on your guard here also. Practice always the most painstaking cleanliness.

Heed well the advice which this circular gives you. Your happiness and your health lie in your own hand."

Your committee has, through its own efforts and through the efforts of others (and here we must especially personify the most excellent work done by our State Board of Health), made every effort to educate and restrain the people of Indiana from the spreading of venereal diseases.

We ask every member of the medical profession for his help, and suggest that in its suppression law, morality and Christianity are good, yet they are subsidiary to education, which in our opinion is the sheet anchor to the solution of the question that has menaced mankind since time immemorial.

REFERENCES.

(1.) Symposium—"The Duty of the Medical Profession to the Public in the Matter of Venereal Diseases and How to Discharge It."
W. J. Herdman, M. D., Ann Arbor, Mich.
Henry D. Halton, M. D., Brattleboro, Vt.

"The War Against Venereal Diseases in France."
Prof. Theodore Tuffier, M. D., Paris.

"The War Against Venereal Diseases in France."
Henry O. Marcy, M. D., Cambridge, Mass.

"The Guarantee of Safety in the Marriage Contract."
Prof. A. Duehessen, Berlin, Germany.

"Protection of the Innocent."
Wm. Lee Howard, M. D., Baltimore, Md.

"Protection of the Innocent."
Edward L. Keyes, M. D., New York.

(2.) Symposium—"Duty of the Profession to Womankind."
In Section of Hygiene and Sanitary Science, A. M. A., Fifty-seventh Session.

"The Physical and Evolutionary Basis of Marriage."
Bayard Holmes, M. D., Chicago.

"The Guarantee of Safety in the Marriage Contract."
Albert H. Burr, M. D., Chicago.

"Education as a Factor in the Prevention of Criminal Abortion and Illegitimacy."
J. H. Carstens, Detroit.

"What Shall We Teach the Public Regarding Venereal Diseases?"
Albert E. Carrier, M. D., Detroit.

"What Shall We Teach the Public Regarding Venereal Diseases?"
George Whiteside, M. D., Portland, Ore.

"What Shall We Teach the Public Regarding Venereal Diseases?"
Brumsford Lewis, M. D., St. Louis, Mo.

REPORT OF COMMITTEE ON NECROLOGY

BY G. W. H. KEMPER, M. D., CHAIRMAN.

The following named counties reported that no deaths had occurred: Adams, Carroll, Cass, Fountain, Huntington, Jennings, Johnson, Laporte, Lawrence, Marshall, Martin, Miami, Monroe, Noble, Owen, Perry, Porter, Posey, Pike, Ripley, St. Joseph, Tippecanoe, Union, Wayne.

The following named counties reported deaths:

Allen—Drs. William H. Myers, Carl Proegler and Isaac M. Rosenthal.
Bartholomew—Dr. Moses N. Elrod.
Clay—Drs. Daniel W. Cushman and Lester F. Smith.
Clinton—Wilbur Alexander.
Delaware—Alfred L. Murray (Hon.).
Elkhart—Drs. Guy M. Brothers and Warren H. Thomas.
Gibson—Dr. Franklin Blair.
Grant—Dr. Aldine Y. Dooley.
Henry—Dr. James L. McShirley.
Howard—Dr. John B. Moore.
Jay—Dr. D. S. Stanton.
Jefferson—Dr. George C. Lewis.
Madison—Dr. William S. Channing.
Marion—Drs. W. B. Fletcher, Geo. O. Jobes, John Kautz, John T. McShane, Lehman H. Dunning.
Shelby—Dr. Joseph Bowlby.
Steuben—Dr. James J. Wilkinson.
Vigo—Dr. Edgar A. Aikman.
Wabash—Drs. John M. Modricker and Carey Shellhamer.
Warrick—Dr. Charles J. Keegan.

Also Dr. Thomas W. Florer, of Corsicana, Tex., a member and primary organizer of the Indiana State Medical Association, and only survived of the charter members by Dr. Wm. H. Wishard and Dr. P. H. Jameson, both of Indianapolis. Dr. Dunning is added to this list as the report was omitted last year.

WILLIAM H. MYERS, M. D.

MEMBER OF THE ALLEN COUNTY MEDICAL SOCIETY.

BORN IN STARK COUNTY, OHIO, DECEMBER 25, 1826.

DIED AT FORT WAYNE, INDIANA, JANUARY 5, 1907.

AGED 80 YEARS.

Dr. Myers received but a common school education, but pursued a course of self study in literature and science prior to taking up the science of medicine and surgery as his life work, and was therefore to a great extent a self-educated man. After several years of such study he read medicine with the late Dr. Glass as his preceptor, at Hayesville, Ashland county, Ohio, and finally matriculated at the Jefferson Medical College, where he graduated in the spring of 1855. He had practiced his profession a few years prior to his graduation, in Navarre, Stark county, Ohio, where, in 1852, he was married to Miss Mary Ann Van Sweringen. After his marriage he located in Loudonville, Ashland county, Ohio, where he continued his practice with the exception of the time spent at Jefferson, until 1859, when he removed to Fort Wayne, Ind., where he entered into partnership with the late Dr. Charles E. Sturgis. In the spring of 1861 he received the appointment of surgeon of the Thirtieth regiment of Indiana volunteers. After several years of such service he was thrown from his horse, fracturing both bones of his left forearm. He returned home to recuperate, and, while convalescing from his injury decided to resign his commission. He continued his practice, which extended over the northern part of the state, until the illness supervened which proved fatal. In his earlier years he was a member of the M. E. church, but throughout his busy life as a physician and surgeon, he was materialistic and agnostic in his ideas. Before his final dissolution, however, in conversation with the pastor of his son's church, he expressed the convictions of his youth, and confidence in the religion in which his parents reposed and in which he was reared.

He was a Royal Arch Mason, a member of various literary, scientific and medical societies in this country and in Europe, to which country he made two trips, visiting the hospitals and universities thereof. Dr. Myers possessed probably the largest library of medical, scientific and literary volumes in the state, which he donated to the Fort Wayne Medical Society.

Dr. Myers was twice married, his first wife having departed this life about twenty-five years ago. His second wife was Miss Essie Preble, of Indianapolis, who also died in May, 1905.

Dr. Myers' funeral was attended by the Fort Wayne Medical Society in a body, many of whom, at the request of the various press reporters of the city, expressed their estimates of the character and worth of the deceased. He was president of the Tri-State Medical Society, of which Dr. K. K. Wheelock is secretary, and who prepared and read before its last meeting an extended notice of the life and labors of Dr. W. H. Myers.

The cause of his death was bronchitis.

(Prepared by Dr. H. V. Sweringen, Fort Wayne, Ind.)

CARL PROEGLER, M. D.

MEMBER OF THE ALLEN COUNTY MEDICAL SOCIETY.

BORN IN COLOGNE, GERMANY, 1837.

DIED AT FORT WAYNE, INDIANA, JANUARY 17, 1907.

AGED 70 YEARS.

Dr. Proegler received his education in Germany. In 1860 he opened an office in New York, where he continued to practice until the outbreak of the civil war. During the war he served as surgeon in one of the hospitals in Washington, and later as regimental surgeon of the Twenty-fifth New York Infantry. At the close of the war he entered the navy and was made fleet surgeon under Admiral Farragut.

In 1870 he returned to Germany to offer his services to his native country in the Franco-Prussian war, at the close of which he again returned to this country and located in Chicago, where he was rendered penniless by the great fire. With many other refugees he made his way to Addison, Ill., where he fell in with a fellow countryman, who befriended him and established him in practice there.

In 1874 he came to this city, where he soon acquired a large practice. He was twice elected secretary of the county board of health, a position he filled with ability and conscientiousness.

Under a rather gruff exterior Dr. Proegler possessed a warm, sympathetic nature, which endeared him to those fortunate enough to be allowed to see beneath his apparent hostility.

He sufferced a cerebral hemorrhage on January 15, from which he died on the 17th.

He is survived by a wife and five children, the latter all grown.

(Prepared by Dr. B. Van Sweringen, Fort Wayne, Ind.)

ISAAC M. ROSENTHAL, M. D.

MEMBER OF THE FORT WAYNE (ALLEN COUNTY) MEDICAL SOCIETY.

BORN IN LAUPHIN, WURTEMBURG, GERMANY, OCTOBER 31, 1831.

DIED AT FORT WAYNE, INDIANA, OCTOBER 29, 1906.

AGED 75 YEARS.

Dr. Rosenthal received his medical education at the Western Reserve University, Cleveland, Ohio, graduating with the highest honors in 1852. He began the practice of medicine at Bedford, Ohio, subsequently removing to Indianapolis, and finally in 1860 made his permanent home in Fort Wayne, where he practiced continuously for forty-six years. He typified in an ideal manner the practitioner of the last generation and was one of the very few survivors of that group, whose place in history will never lack in interest and admiration.

His preliminary education was obtained in the public schools of Germany, in which he early showed a tendency to the study of medicine, availing himself of every opportunity to pursue that special line of study. His preceptor was Dr. Maxwell, of Berlin, Ohio. He was a member of the Jewish synagogue, of the B'nai Brith and Odd Fellows' societies.

While Dr. Rosenthal's medical education had all the defects inseparable from the middle of the nineteenth century, yet he possessed in a high degree the qualities which make a judicious and successful general practitioner. He was always active in attending medical societies and loved to associate with his professional friends—a quality which the stress of modern life bids fair to make a lost art. He probably did not formally take the Hippocratic oath, but those of us who knew him best know that he lived it, simply because with his generous disposition and gentlemanly instincts he could not live otherwise.

A curious incident in his life was the fact that he suffered from a purulent otitis media for more than fifty years, caused by the explosion of a gun. He steadfastly refused surgical relief, and finally died from an abscess of the brain with diffuse meningeal infection, caused by an extension of the middle ear disease to the temporo sphenoidal lobe of the brain. If he had consented to the removal of this focus of infection years before he should be living now in a fair state of health.

He was married to Miss Adelle Rauh, November 30, 1857. She died in 1895, their family of three sons and three daughters still surviving, with the exception of Edward A. Rosenthal, a prominent Chicago attorney, who died in 1900. Of his two surviving sons, one, Dr. M. I. Rosenthal, is a prominent surgeon, and Dr. J. M. Rosenthal is a dentist of this city.

(Prepared by Dr. G. W. McCaskey, Fort Wayne, Ind.)

MOSES NEWTON ELROD, M. D.

MEMBER OF THE BARTHOLOMEW COUNTY MEDICAL SOCIETY.

BORN IN ORANGE COUNTY, INDIANA, APRIL 4, 1838.

DIED AT COLUMBUS, INDIANA, MAY 20, 1907.

AGED 69 YEARS.

Dr. Elrod received his early training in the country schools and in the fifties attended the old Hartsville University, at Hartsville, Bartholomew county, Indiana. He began reading medicine with the late Dr. A. W. Gray, at Orleans, in the late fifties, and in 1860 attended lectures at the Cincinnati College of Medicine and Surgery. He began the practice of medicine in Hardensburg, Washington county, Indiana, in 1860. Soon after the outbreak of the civil war, in July, 1861, he was appointed hospital steward for the Twenty-fourth Indiana Volunteers. On account of ill health he was given his honorable discharge about three months after entering the service and returned to Orleans. When the hospitals for the care of the wounded Union soldiers were opened at New Albany in the spring of 1862 he was assigned to duty as acting assistant surgeon at hospital No. 1. In September of that year, when the old De Pauw College was converted to hospital duty, he was placed in charge there. In April, 1864, he took a transfer to the general hospital at Jeffersonville. After making one of a party of surgeons who went after the wounded of General Banks' army, he returned to New Albany and was in charge of the executive office of the hospitals. During the time he was doing this hospital work he had been attending the Kentucky School of Medicine at Louisville, and was graduated there in the spring of 1864. After the war he practiced medicine at Dover Hill, Martin county, and later moved to Orleans, where he was appointed postmaster, being the first postmaster commissioned in this state by the late President Grant. He held that office six years. During that time he studied law and was admitted to the practice of that profession at the Orange county bar. In 1876 he taught botany in the Southern Indiana Normal at Paoli. In 1877 Dr. Elrod moved to Hartsville, where he practiced medicine until 1897, when he moved to Columbus and retired from active practice. He was a member of the board of United States pension examiners for this county for thirteen years.

In additon to his medical work Dr. Elrod was a student of geology, botany and various forms of scientific phenomena. He was assistant state geologist under State Geologists E. T. Cox, John Collett and S. S. Gorby and made the geological reports on Orange, Bartholomew, Decatur, Fayette, Rush, Union, Cass and Wabash counties. Some of his articles on botany attracted wide attention, and zoological and geological specimens

were named for him and featured in the Indiana reports. He made experiments in other branches of science and at the time of his death was engaged in an experiment on the transmission of sound through the air. He was a member of the Indiana Academy of Science, the Indiana State Medical Society, the Bartholomew County Medical Society and Isham Keith Post, No. 13, G. A. R. He was the first president of the Bartholomew County Society. He was a member of the Tabernacle Christian church, but poor health prevented him from attending services. He took a deep interest in religious subjects and was well versed on the lore of the Bible. He was married April 14, 1859, to Miss Fannie Barker, and she and two children survive. The children are Miss Jennie M. Elrod, librarian in the office of the adjutant-general of Indiana, and Thomas S. Elrod, city editor of the Evening Republican.

(Prepared by H. H. Kamman, M. D., Columbus, Ind.)

DANIEL W. CUSHMAN, M. D.

MEMBER OF CLAY COUNTY MEDICAL SOCIETY.

BORN AT MEROM, SULLIVAN COUNTY, INDIANA, 1855.

DIED AT TERRE HAUTE, INDIANA, MARCH 9, 1907.

AGED 52 YEARS.

Preliminary education in public schools, academy and college in his native town. His preceptor was a leading pioneer practitioner, Dr. Newton Weir, of Sullivan, Ind.

He pursued his medical studies at Cincinnati and Louisville, graduating from the Kentucky School of Medicine in 1881. He immediately located at Cloverland, Ind., where he did a large and lucrative practice during a period of twenty-five years.

He was married in 1887 to Miss Anna Crouse, of Cloverland, who, with one son, survives. Realizing that his health was broken and he could no longer endure the arduous work of the busy country practice, he retired to a new and commodious home in the city of Terre Haute in 1906, there intending to limit his work to office practice. Bright's disease had insidiously established itself, and he succumbed to its ravages.

(Prepared by Dr. G. W. Finley, Brazil, Ind.)

LESTER F. SMITH, M. D.

MEMBER OF THE CLAY COUNTY MEDICAL SOCIETY.

BORN IN BRAZIL, INDIANA. SEPTEMBER 27, 1883.

DIED AT BRAZIL, INDIANA, MAY 1, 1907.

AGED 23 YEARS.

Being the only son of a leading physician, Dr. Jacob F. Smith, he had in mind the study of medicine even before he finished the high school course in his native city. Going to Chicago to pursue his medical studies he took high rank in all his classes, and graduated with honors from the Illinois College of Medicine in the class of 1906. He at once began practice in partnership with his father, and had just opening before him the most brilliant career, as his noble qualities, mental and physical, together with very thorough professional equipment, were recognized by all the community.

Stricken suddenly with a septicaemia too profound for medical or surgical relief, he died, most sincerely mourned by a very wide circle of friends and relatives. His funeral was attended by all the members of the local medical society and many from adjoining counties.

(Prepared by Dr. G. W. Finley, Brazil, Ind.)

WILBUR ALEXANDER, M. D.

MEMBER OF THE CLINTON COUNTY SOCIETY.

BORN AT LETART FALLS, OHIO, DECEMBER 8, 1869.

DIED AT FRANKFORT, INDIANA, JULY 23, 1906.

AGED 36 YEARS.

Dr. Wilbur Alexander received his preliminary education in the Letart Falls (Ohio) high school and at Carleton college, Syracuse, Ohio. He commenced the study of medicine in the office of Dr. J. M. Hysell, Pomeroy, Ohio, after which he entered the Ohio Medical College at Cincinnati, and graduated from that institution with honors in 1893.

He commenced the practice of medicine at Letart Falls, Ohio, but in two years removed to Montmorenci, Indiana, where he engaged in a general practice with marked success for several years. He then took a post graduate course at the Chicago Polyclinic and afterwards located in Frankfort, Ind., where he limited his practice to the diseases of the eye, ear, nose and throat. Later he took an additional post-graduate course at the Manhattan Eye, Ear, Nose and Throat Infirmary in New York city.

December 23, 1896, he married Miss May Gist, of Letart, West Virginia. His wife survives him. Dr. Alexander did not affiliate with any church. He was a member of the Court of Honor, the I. O. O. F., the Masonic and Knights Templar orders. Dr. Alexander was an earnest and conscientious physician, and was recognized by the community and profession, not only as a physician skilled and learned in his work, but a man of strict integrity, genial nature and of universal courtesy. He was loved and honored by all who knew him, and it is to be lamented that his life ended ere its work barely began.

(Prepared by James W. Hadley, M. D., Frankfort, Ind.)

ALFRED L. MURRAY, HONORARY.

MEMBER OF THE DELAWARE COUNTY MEDICAL SOCIETY.

BORN IN HENRY COUNTY, INDIANA, FEBRUARY 25, 1845.

DIED AT EATON, INDIANA, JUNE 7, 1906.

AGED 61 YEARS.

Dr. Murray was educated in the common schools, studied medicine with Dr. John Wendell, of Blountsville, Ind., and attended one term of lectures at the Ohio Medical College.

He began to practice at Economy, Ind., and later removed to Granville, and a few years later to Eaton, Delaware county, Indiana.

He was not a member of any church or secret order.

In 1870 he married Miss Viretto Jordan, of Delaware county, who, with one daughter, Mrs. C. K. Van Buskirk, survive him.

Dr. Murray served for a time as a soldier in the civil war.

Owing to ill health he retired from practice in 1902.

While crossing an interurban track he was accidentally struck by a car and instantly killed.

(Prepared by Dr. C. J. Stover, Eaton, Ind.)

GUY M. BROTHERS, M. D.

MEMBER OF THE ELKHART COUNTY MEDICAL SOCIETY.

BORN IN NEW PARIS, INDIANA, SEPTEMBER, 1875.

DIED AT NEW PARIS, INDIANA, SEPTEMBER 19, 1906.

AGED 31 YEARS.

Dr. Brothers was educated at the high school and Northern Indiana Normal School. He was a pupil of Dr. E. M. Eisenbeiss, of Indianapolis, and graduated at the Medical College of Indiana in 1904.

He located in New Paris, where he continued to practice until the time of his death.

He was a member of the Methodist church, but belonged to no secret order.

His scientific, professional and social standing were excellent.

His death was due to suicide. He was unmarried.

(Prepared by Elkhart County Medical Association.)

WARREN H. THOMAS, M. D.

MEMBER OF THE ELKHART COUNTY MEDICAL SOCIETY.

BORN IN GOSHEN, INDIANA, APRIL 28, 1837.

DIED AT ELKHART, INDIANA, JUNE 7, 1906.

AGED 69 YEARS.

Dr. Thomas was educated at Goshen, and later studied medicine under direction of Dr. Latta, of Goshen.

He graduated at the Hahnemann Medical College of Chicago, in 1875, and located in Elkhart, where he continued to practice until his death.

He was a member of the Congregational church, order of Maccabees, and a Knight Templar.

He married Emma F. Hill, who survives him, as well as one son.

His general scientific, professional and social standing were of a high character.

Death resulted from angina pectoris.

(Prepared by Elkhart County Medical Association.)

FRANKLIN BLAIR, M. D.

MEMBER OF THE GIBSON COUNTY MEDICAL SOCIETY.

BORN IN PRINCETON, INDIANA, OCTOBER 1, 1859.

DIED AT PRINCETON, INDIANA, JUNE 1, 1907.

AGED 47 YEARS.

Dr. Blair was the son of Dr. W. W. Blair and Margaret Warnock Blair, of Princeton. He graduated from the Princeton high school in 1876. In the fall of 1879 he went to the University of Wisconsin, at Madison, where he remained one year. The following year he attended a medical college at Baltimore, Ind. In the fall of 1883 he went to Jefferson Medical College, where he graduated in 1884. After receiving his degree he began practice in Princeton, where he remained until 1889, when he went to Vienna, Austria, and later to Munich, where he was an assistant in the hospital for five months. He returned to Princeton in 1890, and resumed practice.

He became associated with Drs. Anderson and Ziliak in the creation of a sanatorium, which was formally opened January 24, 1907.

Dr. Blair was married to Miss Effie Maud Kolb, May 24, 1904. He left a widow.

He was a member of the United Presbyterian church, and lived a life consistent with his avowal. He was a member of the Gibson County Medical Society and the Indiana State Medical Association.

A few days before the formal opening of the sanatorium, Dr. Blair was taken sick and was removed to that institution a few days after that event. His disease was multiple neuritis. For a time he improved, but afterward grew worse, until the clay house of this world he forsook, and the home everlasting entered.

(Prepared by Dr. G. W. H. Kemper, from newspaper clipping.)

THOMAS WILSON FLORER, M. D.

BORN NEAR WAYNESVILLE, OHIO, NOVEMBER 25, 1822.

DIED AT CORSICANA, TEXAS, MAY 10, 1907.

AGED 84 YEARS 6 MONTHS.

At the age of ten years he removed with his mother and grandparents to Indiana, where he received his early education in the country schools of that state. He began the study of medicine under a private preceptor. He graduated from the Ohio Medical College, March 5, 1850. He began the practice of medicine in Alamo, Ind. Later he practiced in Crawfordsville, Ind., till he enlisted as surgeon in the Twenty-sixth Indiana Regiment, serving both in field and hospital. He served on General Lew Wallace's staff, and the two were warm personal friends. He was transferred in 1862 to Vicksburg, Miss., for hospital work. He was mustered out of service at Vicksburg, January, 1866. He made his home near Meridian, Miss., till 1875, when he moved to Waxahachie, Texas, practicing medicine till 1905, with the exception of two presidential terms, when he served as postmaster at that place under Presidents Arthur and Harrison.

In 1849 he was married to Miss Harriet E. Stone, of Connecticut, a daughter of Isaac Stone, a farmer by occupation. One daughter was born of this union, Harriet E. Parsons, of Red Oak, Texas. In 1850 Mrs. Florer died, and two years later Dr. Florer married Miss Sarah E. Aydelott, of Linden, Montgomery county, Indiana. Six children were born to them, two of whom are living, Mrs. Emma Elder and Miss Annie Florer, of Sedalia, Missouri. The mother of these children died in 1866. Dr. Florer was married a third time to Miss Cornelia Herbert, of Alabama, in 1869. Three children were born of the union, two of whom are living: Mrs. M. W. McAfee and Miss Nena Florer, of Corsicana, Texas. Mrs. Florer died in 1895.

In 1849 Dr. Florer was a delegate to assist in the organization of the Indiana State Medical Society at Indianapolis. He represented Montgomery County, Indiana, and was made one of the vice-presidents of the body. He kept a record of the proceedings of the association for eight years, and later had them bound in one volume, which volume he presented to the State Medical Association. In recognition of this gift he was elected an honorary member of the society.

In 1899 he attended the golden jubilee of the Indiana State Medical Society, held in Indianapolis, being one of four living charter members of the State Society. He was a member of the Methodist Church and also a Mason. He was buried by that order in Waxahachie, Texas, May 11, 1907.

(Prepared by Dr. Florer's daughter, Miss Nena Florer, of Corsicana, Texas.)

ALDINE J. DOOLEY, M. D.

MEMBER OF THE GRANT COUNTY MEDICAL SOCIETY.

BORN IN GRANT COUNTY, INDIANA, OCTOBER 29, 1872.

DIED AT MARION, INDIANA, DECEMBER 18, 1906.

AGED 34 YEARS.

After the common school, Dr. Dooley entered the Roanoke Classical Seminary, and later the Marion Normal College.

His preceptor was Dr. Charles Borden. He graduated at the Rush Medical College in 1896, and located in Marion.

He was a member of the Presbyterian Church, K. of P., I. O. O. F., and Maccabees.

He was an able, successful and courteous physician. June 23, 1897, he married Miss Eva J. Heichert. He left a widow; no children.

Death was due to acute dilatation of the heart caused from la grippe.

(Prepared by Dr. Burnham C. Dale, Marion, Ind.)

JAMES L. McSHIRLEY, M. D.

MEMBER OF THE HENRY COUNTY MEDICAL SOCIETY.

BORN IN RANDOLPH COUNTY, INDIANA, AUGUST 7, 1860.

DIED AT SULPHUR SPRINGS, INDIANA, NOVEMBER 14, 1906.

AGED 46 YEARS.

Dr. McShirley received his preliminary education in the common schools of Henry County. He graduated in medicine at the Ohio Medical College in 1883.

He first began to practice at Mooreland, and in 1888 removed to Sulphur Springs, where he remained until his death. He was a sufferer from Bright's disease, and this compelled him to desist from his work for sevearal years prior to his death.

In May, 1895, he married Miss Jennie Puckett, who died in November, 1896. On February 10, 1897, he married Miss Ella Davis of Winchester, who, with one daughter, survives him.

He was honored and respected.

Death was due to Bright's disease.

(Prepared by Dr. J. A. Tully, Milliville, Ind.)

JOHN B. MOORE, M. D.

MEMBER OF THE HOWARD COUNTY MEDICAL SOCIETY.

BORN IN ROYAL CENTER, CASS COUNTY, INDIANA, NOVEMBER 25, 1841.

DIED AT SEATTLE, WASHINGTON, AUGUST 8, 1906.

AGED 65 YEARS.

Dr. J. B. Moore was one of the physicians that knew how to conduct himself in the sick room. He was a polished gentleman, fluent of speech, gentle of manner and kind of heart.

In 1868 he graduated from the Rush Medical College of Chicago, Ill., after he had spent two years in the office of his preceptor, Dr. I. B. Washburn of Star City, Indiana. After graduating he located at Galveston, Cass County, Indiana, and commenced the practice of medicine. He remained here until 1873, when he moved to Kokomo, Indiana, where he spent the remainder of his active professional life. Dr. Moore was a very busy man and spent much time with his patients.

He was an active member and worker in the Christian Church of Kokomo, Indiana, and gave largely of his time and means to the church of his choice. He sang well and was always in the church choir.

In 1868 he was united in marriage to Miss Martha E. Singer, who still survives him. Three children were born to them—two sons and one daughter. One son died, leaving a son, Charles, and daughter, Mrs. Howard Richardson, both living in Seattle, Washington.

In the Spring of 1906 he went to Seattle, Washington, hoping to regain his health, but was not benefited. He gradually grew worse until death relieved him of his suffering. At his own request he was cremated at Seattle.

Dr. Moore was a pure man, clean of heart, and is greatly missed by his professional brethren and his large list of devoted patrons.

(Prepared by Dr. J. McLean Moulder, Kokomo, Ind.)

D. S. STANTON, M. D.

HONORARY MEMBER OF THE JAY COUNTY MEDICAL SOCIETY.

BORN IN WARREN COUNTY, OHIO, JUNE 11, 1822.

DIED AT PORTLAND, INDIANA, AUGUST 21, 1906.

AGED 84 YEARS.

Dr. Stanton was a pupil of Dr. Judkins, of Fountain City, and graduated at Cincinnati, Ohio. He practiced medicine at Portland, Indiana.

He was a member of the Methodist Church, and also of the Masonic order.

He leaves a widow.

Death was due to senility.

(Prepared by Dr. Harriet Wiley, Portland, Ind.)

GEORGE C. LEWIS, M. D.

MEMBER OF THE JEFFERSON COUNTY MEDICAL SOCIETY.

BORN IN CANAAN, INDIANA, MAY 23, 1855.

DIED AT MADISON, INDIANA, FEBRUARY 27, 1907.

AGED 52 YEARS.

Dr. Lewis' early life was spent on his father's farm, and, later desiring to enter upon the study of medicine, he took a preparatory course of two years in Hanover College. Afterward he graduated from the Ohio Medical College, in 1876, and immediately located in Jefferson County. He was married early in his professional career to Miss Mary J. Demaree, who stil survives him along with four children.

Dr. Lewis began practice at Canaan, Ind., but later removed to Fairview, Switzerland County.

After a few years he removed to Madison, where he was associated with his father, Dr. Jas. R. Lewis. He also practiced at Kent, Ind., for a number of years, and again removed to Madison, where he spent the remaining years in active service. While at Madison he twice served as coroner of Jefferson County, and later was a member of the U. S. board of pension examiners, and acted for several years as secretary of the local Board of Health.

The doctor was a member of the I. O. O. F. and Red Men and of the Jefferson County Medical Society. The doctor was in active practice to the time of his death, and only a few hours before his demise had prescribed for one of his old patients. His death was sudden, resulting from heart disease.

Dr. Lewis had a large circle of friends and loved ones, who sincerely mourn him, and he rests well after his life's work.

(Prepared by Dr. James R. Lewis, Indianapolis, Ind.)

WILLIAM S. CHANNING, M. D.

MEMBER OF THE MADISON COUNTY MEDICAL SOCIETY.

BORN IN ELLICOTTVILLE, NEW YORK, DECEMBER 27, 1851.

DIED AT CHICAGO, ILLINOIS, JUNE 28, 1906.

AGED 54 YEARS.

A few years of his boyhood were spent in Illinois, and in 1868 he returned to Buffalo, N. Y., where he remained until 1875, graduating from the public school in 1873.

In 1875 he went to London, England, and served an apprenticeship as a watchmaker and jeweler. He returned to Olean, N. Y., in 1879, and from there removed to Pendleton, Indiana, in March, 1881. In 1889 he entered the Physio-Medical College of Indiana, graduating in 1891, and at once began practicing at Pendleton, where he remained until death.

He was a member of the Masonic order, K. of P. and I. O. O. F.

Dr. Channing found the field in his own school too narrow, and sought advancement in regular medicine by uniting with the Madison County Medical Society.

(Prepared by Dr. M. A. Austin, Anderson, Ind.)

JOSEPH BOWLBY, M. D.

MEMBER OF SHELBY COUNTY MEDICAL SOCIETY.

BORN IN RUSH COUNTY, INDIANA, FEBRUARY 17, 1854.

DIED AT SHELBYVILLE, INDIANA, JUNE 28, 1906.

AGED 52 YEARS.

Dr. Bowlby received his early education in the common schools of his native county and in the high school at Shelbyville, Ind., after which he taught school for six years. He then entered the Ohio Medical College, from which he was graduated March 8, 1883. The same year he began the practice of medicine at Noah, Shelby County, Indiana., six years later moving to Shelbyville, where he continued in active practice until his death.

Dr. Bowlby was held in high esteem, both professionally and socially. Especially was he considerate in his treatment of his co-laborers. In his daily work he was thorough and conscientious. He was a member of the First Presbyterian Church, a Mason and Knight Templar.

Dr. Bowlby was married April 28, 1885, to Mary Yarling, who, together with two daughters, survive him.

The cause of his death was cerebral hemorrhage, his illness lasting but a few days.

(Prepared by Dr. Walter C. McFadden, Shelbyville, Ind.)

JAMES J. WILKINSON, M. D.

MEMBER OF THE STEUBEN COUNTY MEDICAL SOCIETY.

BORN IN MEADVILLE, PENNSYLVANIA, JUNE 10, 1842.

DIED AT ORLAND, INDIANA, SEPTEMBER 6, 1906.

AGED 64 YEARS.

In early life he removed to Indiana, and was educated at the High School of Butler, Indiana.

He graduated in medicine at the University of Pennsylvania in 1869, and practiced medicine afterward at Butler, DeKalb County; at Fremont, Flint, and Orland, Steuben County.

He was a member in high standing of the I. O. O. F.

He was noted for his kindness to the poor and unfortunate.

He was married three times. His last wife, who survives him, was Mrs. Ada Shipe. He also leaves a son.

His death was due to disease of the bowels.

(Prepared by Dr. Mary Ritter, Angola, Ind.)

EDGAR AMMERAN AIKMAN, M. D.

MEMBER OF THE VIGO COUNTY MEDICAL SOCIETY.

BORN NEAR BONO, VERMILLION COUNTY, INDIANA, JANUARY 15, 1855.

DIED AT CLINTON, INDIANA, APRIL 11, 1906.

AGED 51 YEARS.

Dr. Aikman received his preliminary education at Bono, after which for several years he taught school. Having a natural inclination for the study of medicine, he took up that work under the preceptorship of Dr. M. L. Hall of Newport, Ind. He entered Rush Medical College and graduated at that institution March 31, 1891. He immediately entered upon the practice of medicine at Clinton, Ind., and continued regularly in the work until his death from cerebral meningitis, April 11, 1906. He left a widow, formerly Miss Laura B. Chadd, of Newport, Ind., to whom he was married May 12, 1880. No children were born to them. He was a member of the United Brethren Church and of numerous secret organizations. Dr. Aikman was a learned and scientific physician, imbued with the true scientific spirit of investigation for the sake of knowledge. A former president of his local society, he continued a regular attendant and active and useful worker. He was popular with his medical brethren and his papers and discussions in his society abounded with epigrammatic w't and wisdom.

(Prepared by Dr. M. R. Combs, Terre Haute, Ind.)

JOHN M. MODRICKER, M. D.

MEMBER OF THE WABASH COUNTY MEDICAL SOCIETY.

BORN IN GERMANY, JUNE 25, 1833.

DIED AT WABASH, INDIANA, FEBRUARY 10, 1907.

AGED 73 YEARS.

Following I hand you the obituary of our late brother, Dr. J. M. Modricker, written by himself for publication.

L. E. JEWETT, M. D., Secretary Wabash County Medical Society.

"John Morris Modricker was born at Ratsenburg, Province of East Prussia, Germany, on June 25, 1833. He attended the common school and the gymnasium of his native place, where he graduated in September, 1853. For five years he studied medicine at the Albertus University at Koenigsberg and the Frederic Wilhelm University at Berlin, Germany.

"In 1858 he entered the military service and was promoted to the position of assistant surgeon. In 1865 he emigrated to America and practiced his profession in the State of Indiana. In 1882 he located at Wabash, where he was engaged continuously in the practice of medicine until his death (on February 10, 1907).

"In 1865 the doctor was united in marriage to Frederika Christiana Spaeth. Thirteen children were born to them, of whom eight are living. The doctor united with the Methodist Church April 28, 1897."

Dr. Modricker was struck by a team of horses on Friday preceding his death, being knocked down, suffering two broken ribs, with secondary pneumonia developing, which caused his death.

CAREY SHELLHAMER, M. D.

MEMBER OF THE WABASH COUNTY MEDICAL SOCIETY.

BORN IN COLUMBIANA COUNTY, OHIO, NOVEMBER 9, 1845.

DIED AT PIONEER, WABASH COUNTY, INDIANA, JANUARY 23, 1907.

AGED 61 YEARS.

Attended the public schools in Waltz township until the age of eighteen, then began the study of medicine under the supervision of his preceptor, Dr. Rollin Hutchins, later graduating from the Eclectic Medical College of Cincinnati in 1867. He practiced medicine in Wabash and vicinity up to the time of his last illness. He was not a member of any church or benevolent organization. He was a member of Wabash County Medical Society since 1872. He was joined in wedlock to Emily, daughter of the late Dr. H. H. Perry, in June, 1867. His widow and one daughter survive him.

Death was due to tuberculosis.

(Prepared by Dr. L. E. Jewett, Wabash, Ind.)

CHARLES J. KEEGAN, M. D.

MEMBER OF THE WARRICK COUNTY MEDICAL SOCIETY.

BORN IN MCCUTCHANSVILLE, INDIANA, JANUARY 15, 1832.

DIED AT MILLERSBURG, INDIANA, MARCH 7, 1907.

AGED 75 YEARS.

Dr. Keegan read medicine under Dr. Bray of Evansville, Indiana, and attended Rush Medical College. He graduated in February, 1858.

He practiced at Millersburg until a few years ago, when he retired from practice on account of defective sight and hearing.

He was a charter member of the Warrick County Medical Society and always took an active part in the affairs of the society. He was a member of the M. E. Church, also a member of I. O. O. F.

Dr. Keegan was highly esteemed by all who knew him. His widow, formerly Mrs. Lucy H. Miller, survives him. No children were born to them.

(Prepared by Guy Hoover, Boonville, Indiana.)

DOCTOR WILLIAM B. FLETCHER.

MEMBER OF THE INDIANAPOLIS MEDICAL SOCIETY.

BORN AT INDIANAPOLIS, AUGUST 18, 1837.

DIED AT ORLANDO, FLORIDA, APRIL 25, 1907.

AGED 70 YEARS.

Dr. William B. Fletcher, man of science and man of medicine, was born in the city of Indianapolis, or rather near the city of Indianapolis, on a farm which is now one of the most thickly populated parts of the city. He came of a family which has long been identified with the history of the city in all of its phases, political, financial and social. He early showed a decided individuality and a disposition to act and think independently, which was so characteristic of him in his maturer years. After graduating from Asbury (now Depauw) University, he completed his medical course in the College of Physicians and Surgeons at New York in 1859. At the outbreak of the Civil War he was medical assistant in Camp Morton on the assembling of the Indiana troops with Dr. G. V. Woolen, both under the charge of Drs. P. H. Jameson and John M. Kitchen. After a brief service in the Camp Morton Hospital, he enlisted in the command of Gen. T. A. Morris, and was transferred to that of Gen. J. J. Reynolds, choosing the guise of a musician in order that he might be free to serve his command more signally and heroically in the capacity of a scout.

He volunteered to obtain information concerning the Confederate fortifications in the neighborhood of Laurel Hill, Va., in company with Len Hart, a Virginia backwoodsman. The two were captured near Big Springs and after two weeks under guard in camp, were taken before Gen. Robert E. Lee, in irons. Just before the examination by Gen. Lee he destroyed the notes and maps he had made, along with other papers, by using them to light his pipe as he sat before the camp fire. After being questioned he was remanded to prison and later sentenced to be shot. Prior to this he had made two unsuccessful attempts to escape and had suffered a severe bayonet wound. The sentence of death was commuted by Gen. Lee, and Dr. Fletcher was sent to Libby Prison. His professional ability becoming known, he was paroled to take charge of the gangrene hospital at Rocketts. Later he was exchanged. He continued in the hospital after this, following many battles.

In 1862 he resumed the practice of medicine at Indianapolis. In 1875 he went to Europe and spent two years in the hospitals of Glasgow, London and Paris. In 1869 he helped to organize the Indianapolis Medical College, in which he held the chairs of physiology, materia medica, practice

and therapeutics, and of nervous and mental diseases. Later, on the organizing of the Central College of Physicians and Surgeons, he held the chair of nervous diseases in that institution. In 1882 he was elected the superintendent of the Indiana Central Hospital for the Insane, a position held by him for five years, in which he became known far and wide as an expert alienist. At this time and subsequently he made a number of intracranial operations which, by their daring, followed by recoveries, added greatly to his reputation. After retiring from the superintendency of the Insane Hospital, he resumed the practice of medicine in Indianapolis, giving special attention to mental and nervous diseases. He established a private hospital for the treatment of this class of diseases and later built a large sanitarium called Neuronhurst. Many stories are told of his personal experience in dealing with patients, some of which were full of peril to him. He seemed to be entirely devoid of personal fear.

He was an earnest student of comparative anatomy and did many beautiful dissections and mountings of skeletons and parts. He was a most brilliant speaker and wonderfully facile in drawing and illustrating the subjects he was elucidating. Of recent years he had been in failing health and his last days were spent in Florida, where he had spent several previous winters, escaping the rigors of the northern cold season, seeking strength and knowledge, hunting, fishing and botanizing, and reading the ancient authors and modern scientific and medical literature which he loved.

No better view of this busy man's life can be obtained than from a brief notice of the things he was interested in. With Dr. David Starr Jordan in 1875, he dissected a full grown alligator and made a permanent mount of its heart. He was a devoted student of comparative anatomy. He was bitterly opposed to the use of alcohol beverages in institutions, gave active and valuable support to Francis Murphy, the temperance evangelist, and favored the establishment of a public-supported institution for the care of victims of the alcohol habit. He was instrumental in securing the passage of the law providing for the Board of State Charities. He was instrumental in securing the passage of the law requiring the presence of a female attendant when a female patient was being taken to the hospital by the county sheriff. He was intensely interested in the fusion of the medical colleges of Indiana, having been a teacher in them for over 40 years, and actively identified himself with the new combined school, but his enfeebled condition prohibited his doing what he so much wanted to do.

As one of his friends has written: "He was a combination of the scientific mind and artistic temperament. Everything that was human interested him and, everything that was humane. If he was audacious, satirical and prone to ridicule ignorance or abuse—or what he considered as such—still, in his right hand, he carried gentle peace to silence envious tongues. He had neither fear nor reverence in the usual acceptance of those terms. During his active medical life he saw the great advances of science and in them took a worker's and a teacher's part. But neither he nor his students were deceived by phrases; he believed in the sover-

elgnty of reason. He was open to conviction and had the rare power of withholding his judgment. He fought a good fight; he lived according to his lights, the helpful citizen, father and soldier, the ready, the scientific physician, the good man skilled in healing."

Dr. Fletcher was buried in Crown Hill Cemetery, Indianapolis. In commemoration of him Mr. James Whitcomb Riley wrote a poem, printed in the Indianapolis Star the day of his funeral, as follows:

THE DOCTOR.

"He took the suffering human race;
He read each wound—each weakness clear—
And struck his finger on the place
And said, 'Thou ailest here—and here.'"
—Matthew Arnold.

In Memoriam—Dr. William B. Fletcher, of Indianapolis.

We may idealize the chief of men—
Idealize the humbiest citizen—
Idealize the ruler in his chair—
The poor man, or the poorer millionaire;
Idealize the soldier—sailor—or
The simple man of peace—at war with war—
The hero of the sword or fife-and-drum.
Why not idealize the Doctor some?

The Doctor is by principle, we know,
Opposed to sentiment; he veils all show
Of feeling, and is proudest when he hides
The sympathy which natively abides
Within the stoic precincts of a soul
Which owns strict duty as its first control.
And so must guard the ill, lest worse may come.
Why not idealize the Doctor some?

He is the master of emotions—he
Is likewise certain of that mastery—
Or dare he face contagion in its ire,
Or scathing fever in its leaping fire?
He needs must smile upon the ghastly face
That yearns up tow'rd him in that warded place
Where even the saint-like Sisters' lips grow dumb.
Why not idealize the Doctor some?

He wisely hides his heart from you and me—
He hath grown tearless, of necessity—
He knows the sight is clearer, being blind;
He knows the cruel knife is very kind;
Ofttimes he must be pitiless, for thought
Of the remembered wife or child he sought
To save through kindness that was overcome.
Why not idealize the Doctor some?

Bear with him, trustful, in his darkest doubt
Of how the mystery of death comes out;
He knows—he knows—aye, better yet than we,
That out of Time must dawn Eternity;
He knows his own compassion—what he would
Give in relief of all ills, if he could,
We wait alike one Master—He will come.
Do we idealize the Doctor some?

—James Whitcomb Riley.

April 29, 1907.

(Prepared by Dr. R. H. Ritter, Secretary of the Indianapolis Medical Society.)

DR. LEHMAN HERBERT DUNNING.

MEMBER OF THE INDIANAPOLIS MEDICAL SOCIETY.

BORN AT EDWARDSBURG, MICH., APRIL 12, 1850.

DIED AT INDIANAPOLIS, JANUARY 4, 1906.

AGED 56 YEARS.

Apparently at the zenith of his magnificent mental and physical power, with his mind and heart and hands full of the great work he was doing, and almost his last utterance concerned with a patient he was to operate upon in a few hours, the call of death came to Doctor Dunning quickly and quietly. He truly died with his full armor on and in the fore front of the conflict. Death was good to him and the restless and indomitable energy, the keen, penetrating mind and the cunning hand were not allowed to show any decay or to chafe in a body weakened by disease or age. Born in a little country village, with exceedingly scant facilities for an education, but early showing that unconquerable determination and energy which was so prominent in his character, he got what education he could, finished his medical course at Rush Medical College in 1872, and left college to make his living and reputation with a "pair of patched trousers and four dollars," as he was fond of relating. He began work in a little town in Michigan and practiced later, for ten years, in South Bend, Indiana, finally removing to Indianapolis in 1889. From this humble beginning, wholly by his own efforts and ability, he became intimately and affectionately known to the doctors of Indiana and to the prominent men in this country interested in the specialty which so fully occupied his mind. Wherever he located he soon forged to the front and was eagerly sought out for his services. He first attracted attention by his writings on misplaced kidneys, while at South Bend. He was later called to the chair of Gynecology in the Indiana Medical College, which he filled to the time of his death.

He was primarily a medical man. He was a good business man, but nothing ever distracted his attention or in any way approached the position of a rival in his thoughts.

His death was due to an attack of angina pectoris. While he had had a short time previously a slight attack which was suspicious, but which he had revealed to no one, this was the first clear seizure. Apparently the condition was safely passed and he went quietly to sleep, but sometime in the next few hours, unknown to his family until they attempted to awaken him from what they thought was a natural sleep, the end came and he died quietly and from all appearances quickly and painlessly.

Dr. Dunning contributed much to the current literature along the lines of his specialty and had occupied many positions of honor and responsi-

bility. He had served as president of the Marion County Medical Society, as delegate to the International Medical Congress, and as chairman of the Section of Gynecology and Obstetrics of the American Medical Association. He was actively interested in the hospitals and medical charities of Indianapolis. By years of careful, courteous, time-consuming labor, he built up a great teaching clinic of gynecology in the dispensary of the college. He was the chief of staff of the Deaconess Hospital and gave freely of his time, energy and money to increase its usefulness and efficiency. He was a true friend of the City Hospital and as prompt to respond to the call and as solicitous of his patients there as he was for the wealthy who came to him for relief from suffering. He was a devoted husband and father, exceedingly ambitious for his children, and lived to experience the joy of seeing one son started in his own footsteps, and a daughter developed into an ornament to his home and source of real help and comfort to him. He possessed a deeply spiritual nature and gave to the church as he gave to every other cause that appealed to his heart. He held a very strict code of life, one often disdainfully called puritanical, but to him it was a matter of the greatest weight and from it he evolved a spotless career. He never uttered an unclean word or thought, and his whole influence and example for those with whom he came in contact, especially the medical students, was for righteousness.

To perfect himself in his practice, he visited and worked in the great centers of learning of this and foreign lands, and supplemented this course with wide and constant reading. Feeling the lack of broader cultural training, he read widely in general literature and developed a keen appreciation of the good, the true and the beautiful.

He has left no book, or no compilation of the work of others, although writing over forty papers on his specialty. He met the duties of the days and the hours with great energy, hope and courage, and with equally great success.

(Prepared by Dr. R. H. Ritter, Secretary of the Indianapolis Medical Society.)

JOHN T. McSHANE, M. D.

MEMBER OF THE INDIANAPOLIS MEDICAL SOCIETY.

BORN AT CARMEL, IND., DECEMBER 2, 1847.

DIED AT INDIANAPOLIS, MAY 20, 1906.

AGED 59 YEARS.

Dr. John T. McShane died May 20th, of Bright's disease, at his home, 1822 North Meridian street. His illness began in September, and, accompanied by his wife, he went to New Orleans, hoping to restore his health. He soon returned and rallied for a time, but was forced to give up his practice. For the last five weeks he had been confined to his room. He leaves a widow, whose maiden name was Alice Cole, and a daughter, Mrs. Roy G. Caylor, of Noblesville.

Dr. McShane was one of the well-known physicians of Indianapolis, and stood high in the esteem of the profession. He was born near Carmel, December 2, 1847, a son of James Gray McShane, one of the pioneer residents of that county.

In 1869 Dr. McShane went to Philadelphia, Pa., where he attended Jefferson Medical College. In 1870 he was appointed physician to the medical station of Bedford street, Philadelphia, and during his attendance there on the appearance of relapsing fever, treated many of the first cases of that disease. This brought him into notice and he was appointed port physician, a position he held during the prevalence of that epidemic.

In 1871 he graduated from the Indiana Medical College. In 1885 he attended lectures at Jefferson Medical College, and in 1886 attended the medical department of Tulane University, New Orleans. He was a frequent contributor to medical journals, and his articles have been widely quoted. At the time of his death he was surgeon of the Lake Erie & Western and Monon Railroads.

He came to Indianapolis for permanent residence sixteen years ago and immediately took a high place in the practice of medicine. He was a member of the Indiana State Medical Society, and of the Marion County Medical Society, a member of the Scottish Rite and Nobles of the Mystic Shrine; a Knight of Pythias, an Odd Fellow and a Knight of Honor. He was a member of the Central avenue M. E. church, was deeply interested in the success of the Methodist Hospital, and had he lived would have been on the medical staff of that hospital.

(Prepared by Dr. R. H. Ritter, of Indianapolis.)

DOCTOR JOHN KAUTZ.

HONORARY MEMBER OF THE INDIANAPOLIS MEDICAL SOCIETY.

BORN IN CARROLL COUNTY, INDIANA, AUGUST 12, 1834.

DIED AT INDIANAPOLIS, APRIL 24, 1907.

AGED 73 YEARS.

Dr. Kautz studied medicine at the University of Michigan and at Louisville, and practiced at Dora, Wabash County, for 22 years. He retired from practice in 1902 and moved to Indianapolis. He suffered from chronic bronchitis and a few weeks ago his heart failed under the strain, and he died at the age of 73.

Dr. Kautz enlisted in the 118th Indiana Regiment in the Civil War and served until mustered out. He then enlisted in the 153d Indiana and afterwards served until the close of the war as hospital steward at Louisville, Ky. He was a member of J. H. Emmett Post, G. A. R. He was a member of the Wabash County Medical Society and an honorary member of the Indianapolis Medical Society. Dr. Kautz left a widow, Frances A. Kautz, and a son, Mr. F. R. Kautz, at whose home in Irvington he died.

DR. GEORGE O. JOBES.

HONORARY MEHBER OF THE INDIANAPOLIS MEDICAL SOCIETY.

BORN AT GREENSFORK, WAYNE COUNTY, INDIANA, FEBRUARY 17, 1822.

DIED AT INDIANAPOLIS, IND., FEBRUARY 16, 1906.

AGED 84 YEARS.

The early life of Dr. George O. Jobes was spent on the farm. He graduated in medicine at Cincinnati and located for practice at Farmland, Wayne County. Here he pursued his work until the outbreak of the Civil War, when his old playmate, Oliver P. Morton, then Governor of the State, appointed him State sanitary officer under the direction of the Federal authorities. He was assigned to duty in the camps and hospitals of the South, caring for the wounded and the sick and providing for their transportation to the North. While so engaged he met and fell in love with an army nurse, whom he met for the first time in a hospital at Memphis. They were married soon after the war closed. In 1876 Dr. Jobes removed to Indianapolis, and giving up the active practice, he opened a drug store, which he conducted in the same location until a few weeks before his death. He left a widow and three children, one of whom, Dr. Norman E. Jobes, is now in practice in Indianapolis, having served two terms as superintendent of the City Hospital. Although never an active member of the Indianapolis Medical Society, he was elected an honorary member a few years ago, when all veterans of the war were so elected who had served as either soldiers or physicians.

PRESIDENTS AND VICE-PRESIDENTS

OF THE

INDIANA STATE MEDICAL SOCIETY

SINCE ITS ORGANIZATION.

PRESIDENTS.

Names.	*Residence.*	*Elected.*	*Served*
*L. H. DUNLAP	Indianapolis	1849	1849
*W. T. S. CORNETT	Versailles	1849	1850
*A. CLAPP	New Albany	1850	1851
*GEO. W. MEARS	Indianapolis	1851	1852
*J. H. BROWNE	Lawrenceburg	1852	1853
*E. DEMING	Lafayette	1853	1854
*MADISON J. BRAY	Evansville	1854	1855
*WILLIAM LOMAX	Marion	1855	1856
*DANIEL MEEKER	Laporte	1856	1857
*T. BULLARD	Indianapolis	1857	1858
*NATHAN JOHNSON	Cambridge City	1858	1859
*DAVID HUTCHINSON	Mooresville	1859	1860
*B. S. WOODWORTH	Fort Wayne	1860	1861
*THEOPHILUS PARVIN	Indianapolis	1861	1862
*J. F. HIBBERD	Richmond	1862	1863
*JOHN SLOAN	New Albany	1863	1864
*S. M. LINTON	Columbus	1864	1864
*JOHN MOFFETT (acting president)	Rushville	1864	1864
*M. H. HARDING	Lawrenceburg	1865	1865
*W. LOCKHART (acting president)	Danville	1865	1866
*VEIRLING KERSEY	Richmond	1866	1867
*J. S. BOBBS	Indianapolis	1867	1868
*NATHANIEL FIELD	Jeffersonville	1868	1869
*GEO. SUTTON	Aurora	1869	1870
*R. N. TODD	Indianapolis	1870	1871

*Deceased.

Names.	*Residence.*	*Elected.*	*Served.*
*H. P. AYRES	Fort Wayne	1871	1872
*JOEL PENNINGTON	Milton	1872	1873
*ISAAC CASSELBERRY	Evansville	1873	1874
*W. HOBBS	Knightstown	1873	1874
R. E. HAUGHTON	Richmond	1874	1875
*J. H. HELM	Peru	1875	1876
*S. S. BOYD	Dublin	1876	1877
L. D. WATERMAN	Indianapolis	1877	1878
L. HUMPHREYS	South Bend	1878	1879
*J. R. WEIST	Richmond	1879	1879
*BENJ. B. NEWLAND (acting president)	Bedford	1879	1880
*THOMAS B. HARVEY	Indianapolis	1880	1881
*MARSHALL SEXTON	Rushville	1881	1882
WM. H. BELL	Logansport	1882	1883
*S. E. MUNFORD	Princeton	1883	1884
*J. H. WOODBURN	Indianapolis	1884	1885
*J. S. GREGG	Fort Wayne	1885	1886
G. W. H. KEMPER	Muncie	1886	1887
*H. CHARLTON	Seymour	1887	1887
W. H. WISHARD	Indianapolis	1888	1889
J. D. GATCH	Lawrenceburg	1889	1890
*G. C. SMYTHE	Greencastle	1890	1891
EDWIN WALKER	Evansv lle	1891	1892
G. F. BEASLEY	Lafayette	1893	1894
C. A. DAUGHERTY	South Bend	1893	1894
*E. S. ELDER	Indianapolis	1894	1894
C. S. BOND (acting president)	Richmond	1894	1895
MILES F. PORTER	Fort Wayne	1895	1896
J. H. FORD	Wabash	1896	1897
W. N. WISHARD	Indianapolis	1897	1898
J. C. SEXTON	Rushville	1898	1899
WALKER SCHELL	Terre Haute	1899	1900
GEO. W. MCCASKEY	Fort Wayne	1900	1901
A. W. BRAYTON	Indianapolis	1901	1902
J. B. BERTELING	South Bend	1902	1903
JONAS STEWART	Anderson	1903	1904
GEO. T. MCCOY	Columbus	1904	1905
GEO. H. GRANT	Richmond	1905	1906
GEO. J. COOK	Indianapolis	1906	1907
D. C. PEYTON	Jeffersonville	1907	

*Deceased.

VICE-PRESIDENTS.

Names.	*Residence.*	*Elected.*	*Served.*
*N. Johnson (temporary)	Cambridge City	1849	1849
*L. Ryan (temporary)	Anderson	1849	1849
*T. W. Florer (temporary)	Alamo	1849	1849
*C. Wallace (temporary)	Indianapolis	1849	1849
*A. Clapp	New Albany	1849	1850
*N. Johnson	Cambridge City	1849	1850
*L. Dunlap	Indianapolis	1849	1850
*Dr. Farquher	Wabash	1849	1850
*William Lomax	Marion	1850	1851
*R. Curran	Indianapolis	1850	1851
*William Davidson	Madison	1850	1851
*W. W. Hitt	Vincennes	1850	1851
*H. M. Dowling	New Albany	1851	1852
*S. Grimes	Delphi	1851	1852
*J. Pennington	Milton	1851	1852
*Charles Parry	Indianapolis	1851	1852
*William Byford	Evansville	1852	1853
*William Davidson	Madison	1852	1853
*V. Kersey	Milton	1852	1853
*T. Bullard	Indianapolis	1852	1853
*N. Johnson	Cambridge City	1853	1854
*James McClelland	Jeffersonville	1853	1854
*M. H. Harding	Lawrenceburg	1853	1854
*Samuel Reid	Salem	1853	1854
*O. L. Clark	Lafayette	1854	1855
*P. S. Shields	New Albany	1854	1855
*J. Pennington	Milton	1854	1855
*J. F. Mothershead	Indianapolis	1854	1855
*George Sutton	Aurora	1855	1856
*G. B. Walker	Evansville	1855	1856
*C. Bowman	New Albany	1855	1856
*D. Meeker	Laporte	1855	1856
*John Sloan	New Albany	1856	1857
*W. W. Hitt	Vincennes	1856	1857
*T. W. Florer	Alamo	1856	1857
*John Moffett	Rushville	1856	1857
*T. J. Cogley	Madison	1857	1858
*D. Hutchinson	Mooresville	1857	1858
*C. West	Hagerstown	1857	1858
*W. R. Winton	Wabash	1857	1858
T. R. Austin	New Albany	1858	1859
*Benjamin Newland	Bedford	1858	1859
*S. W. Fry	Crawfordsville	1858	1859
*M. M. Latta	Goshen	1858	1859

*Deceased.

Names.	*Residence.*	*Elected.*	*Served.*
*John Sloan	New Albany	1859	1860
*R. M. O'Ferrall	Lafayette	1859	1860
*J. S. McLellan	Jefferson City	1859	1860
R. E. Haughton	Richmond	1859	1860
J. N. Green	Stilesville	1860	1861
*Charles Fishback	Shelbyville	1860	1861
L. Humphrey	South Bend	1860	1861
*Isaac Casselberry	Evansville	1860	1861
*Calvin West	Hagerstown	1861	1862
*Henry Cox	Danville	1861	1862
A. H. Robbins	Rochester	1861	1862
J. A. Skinner	Vincennes	1861	1862
*W. R. Winton	Wabash	1862	1863
*H. G. Sexton	Rushville	1862	1863
*A. Preston	Greencastle	1862	1863
*John Moffett	Rushville	1862	1863
*A. G. Preston	Greencastle	1863	1864
*John Moffett	Rushville	1863	1864
*Benjamin Newland	Bedford	1863	1864
*Calvin West	Hagerstown	1863	1864
*Wilson Lockhart	Danville	1864	1865
*T. B. Harvey	Indianapolis	1865	1866
*J. H. Woodburn	Indianapolis	1866	1867
*R. B. Jessup	Vincennes	1867	1868
*R. N. Todd	Indianapolis	1868	1869
*H. P. Ayers	Fort Wayne	1869	1870
*I. M. Rosenthal	Fort Wayne	1870	1871
*J. K. Bigelow	Indianapolis	1871	1872
R. E. Haughton	Richmond	1872	1873
*Wilson Hobbs	Knightstown	1873	1874
*W. B. Lyons	Huntington	1874	1875
*F. W. Beard	Vincennes	1875	1876
E. D. Laughlin	Orleans	1876	1877
*N. P. Howard	Greenfield	1877	1878
*Benj. Newland	Bedford	1878	1879
J. D. Gatch	Lawrenceburg	1879	1880
John D. Mitchell	Terre Haute	1880	1881
F. J. Van Vorhis	Indianapolis	1881	1882
*S. H. Charlton	Seymour	1882	1883
W. H. Schultz	Lebanon	1883	1884
*J. S. Gregg	Fort Wayne	1884	1885
W. J. Hurt	Waynetown	1885	1886
*W. V. Wiles	Spencer	1886	1887
C. W. Burket	Warsaw	1887	1888
*A. G. Porter	Lebanon	1888	1889
Silas T. Yount	Lafayette	1889	1890

*Deceased

Names.	*Residence.*	*Elected.*	*Served.*
H. D. Wood	Angola	1890	1891
Erwin Wright	Huntington	1891	1892
C. H. Smith	Lebanon	1892	1893
T. F. Leech	Crawfordsville	1893	1894
C. S. Bond	Richmond	1894	1895
E. L. Larkins	Terre Haute	1895	1896
W. F. Batman	Lebanon	1896	1897
Jonas Stewart	Anderson	1897	1898
Geo. F. Keiper	Lafayette	1898	1899
Samuel Kennedy	Shelbyville	1899	1900
A. M. Hayden	Evansville	1900	1901
J. B. Berteling	South Bend	1901	1902
W. H. Gilbert	Evansville	1902	1903
Chas. A. White	Danville	1903	1904
I. N. Trent	Muncie	1903	1904
M. G. Moore	Vincennes	1903	1904
H. J. Hall	Franklin	1904	1905
C. T. Hendershot	Cannelton	1904	1905
D. J. Lor ng	Valparaiso	1904	1905
D. W. Stevenson	Richmond	1905	1906
Harry C. Sharp	Jeffersonville	1905	1906
W. R. Davidson	Evansville	1905	1906
J. B. Garber	Dunkirk	1906	1907
C. C. Terry	South Bend	1906	1907
Chas. Chittick	Frankfort	1906	1907
W. H. Stemm	No. Vernon	1907	
A. F. Knoefel	Linton	1907	
Geo. R. Green	Muncie	1907	

LIST OF MEMBERS

OF THE

INDIANA STATE MEDICAL ASSOCIATION.

ADAMS COUNTY.

OFFICERS.

J. M. Miller, President.
H. F. Costello, Vice-Pres.
Marie L. Holloway, Sec.-Treas.

CENSORS.

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H. F. Costello.
P. B. Thomas.

MEMBERS.

Aspey, H. M., Geneva.
Beavers, S. G., Decatur.
Boyers, J. S., Decatur.
Clark, C. S., Decatur.
Clark, S. D., Decatur.
Costello, H. L., Decatur.
Coverdale, Earl G., Decatur.
Coverdale, J. S., Decatur.
Graham, O. M., Geneva.
Holloway, Marie L., Decatur.
Keller, H. E., Decatur.
Mattox, L. L., Geneva.
McMillen, W. W. P., Decatur.
Miller, J. M., Decatur.
Parrish, M. H., Monroe.
Price, C. R., Geneva.
Smith, W. E., Decatur.
Swarts, W. W., Geneva.
Thomas, P. B., Decatur.
Wilson, R. S., Berne.

FORT WAYNE (ALLEN COUNTY) MEDICAL SOCIETY.

OFFICERS.

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C. H. English, Vice-Pres.
J. C. Wallace, Secretary.
Wm. P. Whery, Treasurer.
H. A. Duemling, Delegate.

CENSORS.

K. K. Wheelock.
S. H. Havice.
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Barnett, W. W., Ft. Wayne.
Beall, Chas. G., Ft. Wayne.
Bell, E. E., Ft. Wayne.
Bower, G. B. M., Ft. Wayne.
Brudi, G. G., New Haven.
Bruggeman, H. O., Ft. Wayne.
Buchman, A. P., Ft. Wayne.
Bulson, A. E., Jr., Ft. Wayne.

Brown, L. E, Ft. Wayne.
Bohnan, R. M., Ft. Wayne.
Calvin, J. Carrithers, Ft. Wayne.
Calvin, W. D., Ft. Wayne.
Carey, W. W., Ft. Wayne.
Crull, E. A., Ft. Wayne.
Culp, L. L., Ft. Wayne.
Dancer, Chas. R., Ft. Wayne.
Deming, N. L., Ft. Wayne.
Dinnen, Jas. M., Ft. Wayne.
Drayer, L. P., Ft. Wayne.
Duemling, H. A., Ft. Wayne.
De Vaux, Edw. F., Ft. Wayne.
Doolittle, B. U., Ft. Wayne.
English, C. H., Ft. Wayne.
Enslen, Wm., Ft. Wayne.
Geary, J. K., Ft. Wayne.
Gilpin, J. H., Ft. Wayne.
Goba, Bertha, Ft. Wayne.
Gordon, C. W., Ft. Wayne.
Greenawalt, G. L., Ft. Wayne.
Gross, W. O., Ft. Wayne.
Hamilton, Allen, Ft. Wayne.
Havice, S. H., Ft. Wayne.
Hetrick, J., Ft. Wayne.
Hull, Chester E., Ft. Wayne.
Kane, Alfred, Ft. Wayne.
Kesler, A. J., Ft. Wayne.
Merz, H. G., Ft. Wayne.
Macbeth, A. H., Ft. Wayne.
Macbeth, Harriet S., Ft. Wayne.
Mentzer, S. E., Monroeville.
Mercer, J. D., Poe.
Morgan, E. E., Ft. Wayne.
McCaskey, G. W., Ft. Wayne.
McEvoy, Jas. B., Ft. Wayne.
McHugh, J. E., Ft. Wayne.
McKeeman, R. B., Ft. Wayne.
McOscar, E. J., Ft. Wayne.
Nierman, H. G., Ft. Wayne.
Nieschang, C. C. F., Ft. Wayne.
Null, L. S., New Haven.
Porter, M. F., Ft. Wayne.
Ranke, J. H., Ft. Wayne.
Rhamy, B. W., Ft. Wayne.
Rosenthal, M. I., Ft. Wayne.
Ross, Geo. A., Ft. Wayne.
Ruhl, Wm. D., Ft. Wayne.
Rothschild, Chas. J., Ft. Wayne.
Schilling, John, Ft. Wayne.
Schilling, Carl, Ft. Wayne.
Schneider, A. L., Ft. Wayne.
Rawles, L. T., Huntertown.
Sledd, S. D., Ft. Wayne.
Stemen, Geo. B., Ft. Wayne.
Stultz, J. E., Ft. Wayne.
Sweringen, H. V., Ft. Wayne.
Pulliam, J. M., Ft. Wayne.
Smith, Guy A., Ft. Wayne.
Schick, M. F., Ft. Wayne.
Squires, J. W., Ft. Wayne.
Van Buskirk, E. M., Ft. Wayne.
Van Sweringen, B., Ft. Wayne.
Van Sweringen, G., Ft. Wayne.
Wallace, J. C., Ft. Wayne.
Weaver, B. P., Ft. Wayne.
Wheelock, K. K., Ft. Wayne.
Whery, Wm. P., Ft. Wayne.
Whery, Mary A., Ft. Wayne.
Wybourn, D. C., Sheldon.
White, R. P., Ft. Wayne.

TRANSFERRED.

Hammond, A. K., Lagrange.
Stemen, W. E., Denver, Colo.

DECEASED.

I. M. Rosenthal, Fort Wayne.
Wm. H. Myers, Fort Wayne.
Carl Proegler, Fort Wayne.

REMOVED.

J. E. Rarick.

HONORARY.

Stemen, C. B., Kansas City, Kas.
Boyers, J. S., Decatur.
Wilking, V., Roanoke.
Beavers, S. D., Decatur.
Williams, Alice B., Columbia City.

BARTHOLOMEW COUNTY.

OFFICERS.

D. J. Marshall, President.
Bertha A. Clouse, Vice-Pres.
H. H. Kamman, Sec.-Treas.
John Little Morris, Delegate.

CENSORS.

R. E. Holder.
A. P. Roope.
Geo. E. Reynolds.

MEMBERS.

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Banker, A. J., Columbus.
Banker, W. T., Columbus.
Benham, J. W., Columbus.
Butler, W. H., Columbus.
Clouse, Bertha A., Columbus.
Cosby, G. O., Elizabethtown, R.F.D 18.
DeLong, O. A., Azaila.
Elrod, M. N., Columbus.
Fitzpatrick, B., Columbus.
Francis, E. T., Columbus.
Hawes, J. K., Columbus.
Holder, R. E., Columbus.
Kamman, H. H., Columbus.
Kirkpatrick, A. M., Columbus.
McCoy, Geo. T., Columbus.
Marshall, D. J., Columbus.
Mennet, O. H., Columbus.
Morris, J. L., Columbus.
Norton, F. D., Columbus, R. F. D. 1.
Norton, W. J., Hope.
Regennas, E. G., Hope.
Reynolds, G. E., Columbus.
Roope, A. P., Columbus.
Suverkrup, Lottie R. A., Columbus.
Voris, S. M., Columbus.
Wisner, W. E., Columbus.
Wood, E. U., Columbus.

BENTON COUNTY.

Cook, Clark, Fowler.
Mavity, Everett, Fowler.
Randall, E., Ambia.
Yager, E. J., Otterbein.

BLACKFORD COUNTY.

OFFICERS.

J. A. Taylor, President.
C. W. Corey, Vice-Pres.
M. M. Clapper, Sec.-Treas.
F. M. Reynolds, Delegate.

CENSORS.

Samuel Hollis.
M. M. Clapper.
C. A. Sellers.

MEMBERS.

Bell, C. S., Hartford City.
Clapper, M. M., Hartford City.
Corey, C. W., Hartford City.
Davisson, H. C., Hartford City.
Hollis, Samuel, Hartford City.
Hollis, Ella A., Hartford City.
Hollis, W. A., Hartford City.
Landon, Lewis C., Priam.
Lorimore, John H., Hartford City.
Reynolds, Francis M., Montpelier.
Sellers, John, Montpelier.
Sellers, Charles A., Montpelier.
Shull, C. Q., Montpelier.
Taylor, J. A., Montpelier.
Thornton, Walter E., Montpelier.
Harrold, John R., Roll.
Maddox, S. E., Montpelier.

SUSPENDED.

Templin, T. B., Hartford City.
Scott, E. K., Hartford City.

BOONE COUNTY.

OFFICERS.

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A. P. Fitch, Vice-Pres.
DeLaskie Smith, Secretary.
J. S. Reagan, Treasurer.

CENSORS.

C. D. Umberhine.
C. H. Smith.
W. H. Schultz.

MEMBERS.

Brent, I. N., Jamestown.
Bounell, T. A., Jamestown.
Brendell, J. F., Zionsville.
Ball, J. R., Lebanon.
Engleman, L. P., Reese Mills.
Fitch, A. P., Lebanon.
Hardy, J. S., Lebanon.
Hurt, G. K., Thorntown.
Jones, A. B., Lebanon.
Little, P. B., Whitestown.
Lee, D. F., Zionsville.
Masters, Luella M., Thorntown.
Reagan, J. S., Lebanon.
Roark, B. H., Jamestown.
Schultz, Guy A., Lebanon.
Schultz, W. H., Lebanon.
Shields, J. S., Elizaville.
Smith, C. H., Lebanon.
Smith, DeL., Lebanon.
Umberhine, C. D., Reese Mills.
Van Nuys, Mary M., Lebanon.
Williams, W. H., Lebanon.
Johns, Elmer D., Zionsville.

CARROLL COUNTY.

OFFICERS.

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C. M. Kennedy, Vice-Pres.
W. R. Quick, Sec.-Treas.
C. E. Scholl, Delegate.

CENSORS.

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H. Y. Mullin.
C. M. Kennedy.
F. H. Robinson.

MEMBERS.

Alexander, W. P., Camden.
Buck, G. M., Burrows.
Callane, M. D , Flora.
Carney, J. E., Pyrmount
Carter, Henry, Bringhurst.
Chittick, A. J., Burlington
Clauser, A. C., Delphi.
Cochran, I. N., Delphi.
Conway, P. W., Ockley.
Crampton, C. C., Delphi.
Egan, B. W., Carroll.
Galbreth, W. H., Rockfield.
Heckman, C. C., Yeoman.
Kennedy, C. M., Camden.
Kitchell, J. E., Deer Creek.
Lyons, F. P., Flora.
McCleary, D. A., Deer Creek.
McNeal, Geo. L., Deer Creek.
Mullin, H. Y., Rockfield.
Peter, Ed. L., Flora.
Quick, Wm. R., Delphi.
Robinson, F. H., Delphi.
Scholl, Charles E., Camden.
Sharrer, W. F., Delphi.
Shirar, Lewis, Flora.
Shultz, J. J., Delphi.
Sigler, Glenn V., Burlington.
Trobaugh, W. A., Cutler.
Wagoner, E. D., Burrows.

SUSPENDED.

Camp, C. E., Camden.
Snyder, A. F., Camden.
Walker, E., Delphi.

CASS COUNTY.

OFFICERS.

B. C. Stevens, President.
H. B. Hill, Vice-Pres.
G. D. Miller, Sec.-Treas.
G. D. Miller, Delegate.

CENSORS.

J. P. Hetherington
R. E. Troutman.
J. Z. Powell.

MEMBERS.

Bartholomew, A. C., Logansport.
Barnfield, J. H., Logansport.
Bradfield, John, Logansport.
Busjahn, F. A., Logansport.
Cady, N. W., Logansport.
Gilbert, J. L., Logansport.
Huffman, G. E., Long Cliff.
Hallanan, Joseph, Logansport.
Hessler, Robert., Logansport
Hill, H. B., Logansport.
Hetherington, J. P., Logansport
Hall, Joseph, Logansport.
Holloway, W. A., Logansport.
Herrmann, F. J., Logansport.
Little, J. A., Logansport.
Lybrook, Wm. O., Young America.
Miller, G. D., Logansport.
McCully, C. N., Logansport.
Marshall, G. D., Young America.
Miller, H. H., Galveston.
Mayfield, Marcellus, Royal Center.
Powell, J. Z., Logansport.
Palmer, A. L., Logansport.
Nicodemus, John, Logansport.
Reed, J. H., Logansport.
Rubsam, J. H., Logansport
Rogers, J. G., Long Cliff.
Schultz, J. B., Logansport.
Stevens, B. C., Logansport
Stewart, J. W., Logansport
Stanton, J. J., Logansport.
Thomas, C. L., Logansport
Tucker, A. W., Logansport
Troutman, R. E., Logansport
Zinninger, Lucerne.

SUSPENDED.

Cornell, F., Galveston.
Terflinger, W., Logansport.

REMOVED.

Parrish, Rebecca, Logansport

HONORARY.

Bell, Wm, H.. Logansport.
Herrmann, A. J., Long Beach, Cal.

CLARK COUNTY.

OFFICERS.

O. P. Graham, President.
E. N. Flynn, Vice-Pres.
Austin Funk, Sec.-Treas.
Austin Funk, Delegate.

CENSORS.

Geo. W. Twomey.
I. N. Ruddell.
C. C. Crum.

MEMBERS.

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Coombs, David, Charlestown.
Crum, C. C., Jeffersonville.
Elrod, E. L., Henryville.
Flynn, E. N., Jeffersonville.
Funk, Austin, Jeffersonville.
Graham, O. P., Jeffersonville.
Hancock, C. F. C., Jeffersonville.
Hobday, Wm. H., Louisville, Ky.
Jones, Cadwallader, Charlestown.
McBride, I., Jeffersonville.
Peyton, D. C., Jeffersonville.
Reynolds, I. M., Memphis.
Ruddell, I. N., Jeffersonville.
Samuels, W. L., Winnemecca, Nev.
Sharp, H. C., Jeffersonville.

Sheets, W. H., Jeffersonville.
Stalker, J. Bodine, Borden.
Stockwell, John, Charlestown.
Twomey, Geo. W., Jeffersonville.
Varble, W. M., Jeffersonville.
Walker, James H., Henryville.
Crum, Wayne H., Sellersburg.
Johnson, Francis W., Utica.

CLAY COUNTY.

OFFICERS.

J. L. Lambert, President.
H. J. Pierce, Vice-Pres.
G. W. Finley, Sec.-Treas.
Frederick Nussel, Delegate.

CENSORS.

Frederick Nussel.
S. G. Hollingsworth.
L. J. Smith.

MEMBERS.

Dilley, Fred C., Brazil.
Finch, Gilbert R., Center Point.
Gregg, Jos. W., Brazil.
Hawkins, Robt. W., Brazil.
Finley, George W., Brazil.
Hollingsworth, S. G., Brazil.
James, Oliver, Brazil.
Howes, Jarvis M., Bowling Green.
Lambert, Junius L., Brazil.
Lewis, George F., Asheville.
Nussel, Frederick, Brazil.
Orr, Wm. H., Brazil.
Pahn, William, Harmony.
Pell, George M., Carbon.
Pierce, Harold J., Cloverland.
Rawley, James A., Brazil.
Smith, Jacob F., Brazil.
Sourwine, John D., Brazil.
Veach, Patrick H., Staunton.
Thornton, Felix G., Knightsville.
Weaver, Timothy M., Staunton.
Williams, Lewis L., Brazil.
Gifford, Joseph C., Brazil.
Young, Melvin H., Harmony.

SUSPENDED.

Black, Silas D., Brazil.

DECEASED.

Cushman, Daniel W., Terre Haute.
Smith, Lester F., Brazil.

CLINTON COUNTY.

OFFICERS.

S. B. Sims, President.
W. J. Fernald, Vice-Pres.
Chas. Chittick, Sec.-Treas.
Chas. Chittick, Delegate..

CENSORS.

W. H. Curtiss.
W. J. Fernald.
J. E. Robison.

MEMBERS.

Sims, S. B., Frankfort.
Chittick, Chas., Frankfort.
Fernald, J. J., Frankfort.
Robison, J. E., Geetingsville, R.R. No.1.
McCarty, M. J., Frankfort.
Lambert, J. C., Colfax.
Hadly, J. W., Frankfort.
Zinn, C. A., Michigantown
Edmonds, O. E., Frankfort.
Bolden, F. M., Frankfort.
Coble, A. H., Frankfort.
Sickler, J. R., Frankfort.
Curtiss, W. H., Frankfort.
White, B. O., Sedalia.
Clark, M. W., Rossville.
Brown, G. W., Frankfort.
McGuire, W. H., Frankfort.
McDonald, F. G., Frankfort.

DECEASED.

Alexander, W., Frankfort.

DAVIESS COUNTY.

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Henry Gers, Vice-Pres.
Thomas F. Spink, Sec.-Treas.

CENSORS.

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Henry Herr.
T. F. Spink.

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DeMotte, Jerome, Odon.
Donaldson, A. I., Washington.
Elrod, S. B., Raglesville.
Fitzgibbon, John, Washington.
Gers, Henry, Washington.
Herr, Henry, Washington.
Holder, Union H., Washington.
Hollingsworth, Ernest, Washington.
Knapp, A. B., Washington.
Lett, O. E., Glendale.
Michaels, Joseph F., Montgomery.
May, Vance, Washington.
Millis, E. D., Plainville.
McKittrick, Ora K., Plainville.
McPherson, S. L., Montgomery.
Rankin, T. B., Odon.
Scudder, Charles P., Washington.
Smoot, D. Brooks, Washington.
Spink, Thomas F., Washington.
Willeford, George W., Washington.
Willeford, R. Waldo, Washington.
Yenne, Charles H., Washington.

REMOVED.

Parks, James F., Cumback.

DEARBORN COUNTY.

OFFICERS.

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C. W. Cowen, Vice-Pres.
Jas. F. Treon, Sec.-Treas.
E. J. Libbert, Delegate.

CENSORS.

E. J. Libbert.
D. E. Johnston.
E. J. Emmert.

MEMBERS.

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Cowen, C. W., Rising Sun.
Duncan, Wm. F., Manchester.
Elfers, John, Rising Sun.
Fagaly, A. T., Lawrenceburg.
Ford, O. P. M., Aurora.
Emmert, E. J., Lawrenceburg.
Haynes, W. H., Aurora.
Holmes, Ella S., Aurora.
Henry, W. C., Aurora.
Jaquith, O. S., Lawrenceburg.
Johnston, D. E., Moores Hill.
Libbert, E. J., Aurora.
Mueller, F. M., Lawrenceburg.
Newforth, C., Sunman.
Smith, George F., Lawrenceburg.
Steveson, George A., Rising Sun.
Sutton, H. H., Aurora.
Treon, Jas. F., Aurora.
Neffner, Robert T., Weisburg.
Elliott, J. C., Guilford.
Shaw, C. W., Rising Sun.

REMOVED.

Birchfield, J. W., New Alsace.
Ketcham, C. L., Guilford.

DECATUR COUNTY.

OFFICERS.

Chas. L. Williams, President.
R. M. Thomas, Vice-Pres.
Curtis Bland, Sec.-Treas.
Geo. S. Crawford, Delegate.

CENSORS.

Geo. S. Crawford.
B. S. White.
W. E. Thomas.

MEMBERS.

Alexander, John H., Greensburg.
Bland, Curtis, Greensburg.
Burroughs, J. P., Westport.
Crawford, George S., Milford.
Grover, Charles B., Greensburg.
Howard, F. M., St. Paul.
Kercheval, C. F., Greensburg.
Sanders, I. M., Greensburg.
Thomas, R. M., Greensburg.
Thomas, W. E., Clarksburg.
Welch, O. F., Westport.
White, B. S., Greensburg.
Williams, Chas. L., St. Paul.
Wood, Jas. M., Greensburg.
Bentle, P. C., Greensburg.
Bird, Chas. R., Greensburg.
Westhafer, Edson K., Westport.

REMOVED.

Fleming, H. G., Indianapolis.

SUSPENDED.

Riley, Sr., J. H. S., Sardinia.

DEKALB COUNTY.

OFFICERS.

Lewis N. Geisinger, President.
M. E. Klingler, 1st Vice-Pres.
J. B. Casebeer, 2d Vice-Pres.
Frank Bevier, Secretary.
J. C. Baxter, Treasurer.
J. B. Casebeer, Delegate.

CENSORS.

W. F. Shumaker.
Chas. S. Stewart.
Francis S. Browne.

MEMBERS.

Baxter, J. C., Auburn.
Bevier, Frank, Waterloo.
Broughton, Frank A., Waterloo.
Brunson, V. C., Newville.
Casebeer, J. B., Auburn.
Darby, A. B., Waterloo.
Geisinger, Lewis N., Auburn.
Matheny, F. G., Auburn.
Nusbaum, W. H., Auburn.
Nusbaum, J. D., Auburn.
Shumaker, W. F., Butler.
Stewart, Charles S., Auburn.
Swarts, Vesta M., Auburn.
Swarts, W. W., Auburn.
Hines, F. M., Auburn.
Klingler, M. E., Garrett.
Showalter, J. E., Waterloo.

REMOVED.

Lane, C. D., Waterloo.

SUSPENDED.

Thompson, J. F., Garrett.
Browne, F. S., Garrett.
Buchtel, J. O., Auburn.

DELAWARE COUNTY.

OFFICERS.

W. S. Brandon, President.
A. E. Vinton, Vice-Pres.
H. S. Bowles, Sec.-Treas.
I. N. Trent, Delegate.

CENSORS.

P. C. Barnard.
H. M. Winans.
F. E. Hill.

MEMBERS.

Andrews, G. R., Muncie.
Atkinson, J. M., Eaton.
Ball, Clay A., Muncie.
Ball, L. L., Muncie.
Barnard, P. C., Oakville.
Bell, J. N., New Burlington.
Bowles, H. S., Muncie.
Brandon, W. S., Daleville.
Bucklin, G. W., Muncie.
Cecil, A. A., Muncie.
Cooper, A. M., Muncie.
Cowing, H. A., Muncie.
Dunn, W. H., Gaston.
Fair, H. D., Muncie.
Frank, H. P., Muncie.
Frazer, Chas., Muncie.
Good, A. H., Muncie.
Green, D. M., Muncie.
Green, G. R., Muncie.
Henry, T. C., Cowan.
Hill, F. E., Muncie.
Houseman, Kate, Muncie.
Jump, Chas. A., Selma.
Jump, S. G., Selma.
Kearns, T. A., Muncie.
Kemper, A. T. Muncie.
Kemper, G. W. H., Muncie.
Kemper, W. W., Muncie.
Kilgore, Frank, Daleville.
Mann, E. B., Muncie.
Mansfield, T. J., Royerton.
Miller, C. E., Muncie.
Mix, C. M., Muncie.
Molloy, W. J., Muncie.
Owens, O. W., Muncie.
Poland, U. G., Muncie.
Rea, C. G., Muncie.
Ried, S. M., Muncie.
Shaw, H. M., Gaston.
Smith, C. W., Muncie.
Spickermon, H. R., Muncie.
Spurgeon, O. E., Muncie.
Spurgeon, W. A., Muncie.
Stover, C. J., Eaton.
Trent, I. N., Muncie.
Vanderburg, J. M., Albany.
Vinton, A. E., Muncie.
Wadsworth, W. W., Muncie.
Winans, H. M., Muncie.
Wright, C. H., Yorktown.
Mitchell, W. P., Gaston.
Jackson, F. G., Muncie.
Tindol, E. F., Muncie.

HONORARY.

Bowles, T. J., Muncie.
Downing, J. R., Yorktown.
Mitchell, Harvey, Muncie.
Munsey, D. V., Gaston.
Murray, A. L., Eaton.

SUSPENDED.

Tuttle, J. R., Wheeling.

WITHDRAWN.

Adams, B. O., Eaton.

REMOVED.

Burcham, H. C., Albany.

DUBOIS COUNTY.

OFFICERS.

E. G. Lukemeyer, President.
L. B. Johnson, Vice-Pres.
C. R. Ramsbrok, Sec.-Treas.
John P. Salb, Delegate.

CENSORS.

C. W. Schwartz.
H. W. Stork.
A. G. Wollenmann.

MEMBERS.

Wollenmann, A. G., Ferdinand.
Lukemeyer, E. G., Huntingburg.
Lukemeyer, L. C., Huntingburg.
Salb, J. P., Jasper.
Ramsbrok, C. R., Huntingburg.
Johnson, L. B., Ireland.
Knapp, Victor, Ferdinand.
Kelso, U. G., Dubois.
Schwartz, C. W., Huntingburg.
Schriefer, E. E., Ferdinand.
Stork, H. W., Holland.
Casper, John, Jasper.
Sturm, E. A. Jasper.
Steinkamp, E. F., Haysville.

ELKHART COUNTY.

OFFICERS.

Albert L. Fisher, President.
W. B. Kreider, Vice-Pres.
Walter A. Stauffer, Sec.-Treas.
Geo. W. Spohn, Delegate.

CENSORS.

Chas. M. Eisenbeis.
S. W. Baer.
L. D. Miller.

MEMBERS.

Ash, E. E., Goshen.
Bauman, N. C., Goshen.
Becknell, Irvin J., Goshen.
Benham, Francis A., Jr., Elkhart.
Brothers, Guy M.,* New Paris.
Cook, J. Albert, Goshen.
Defrees, Henry, Nappanee.
Dewey, Fred N., Elkhart.
Dutrow, C. E., Bristol.
Eby, Henry W., Goshen.
Eckleman, F. C., Elkhart.
Eckleman, Metius M., Elkhart.
Eisenbeiss, Charles M., Elkhart.
Farver, M. A., Middlebury.
Fisher, Albert L., Elkhart.
Fleming, Claude Filimore, Elkhart.
Fleming, J. C., Elkhart.
Frink, Charles W., Elkhart.
Goodrich, Charles D., Elkhart.
Haggerty, Robert Q., Elkhart.
Hall, Hugh Martin, Millersburg.
Hani, William F., Middlebury.
Hauenstein, George W., Elkhart.
Hollingsworth, Allen S., Goshen.
Hoopingarner, George B., Elkhart.
Ihrig, Francis M., Goshen.
Inks, John S., Nappanee.
Kirby, George Wightman, Millersburg.
Kistner, John W., Elkhart.
Knepple, LeMar, Wakarusa.
Kreider, M. K., Goshen.
Kreider, William B., Goshen.
Kuhn, Benj. F., Elkhart.
Lemon, Herbert K., Goshen.
Lockwood, Reuben L., Elkhart.
Mathews, James, New Paris.
McCormick, Robert Seth, Nappanee,
Miller, D. L., Goshen.
Mumaw, Henry A., Elkhart.
Murphy, R. M., Elkhart.
Neal, William A., Elkhart.
Page, W. B., Middlebury.
Price, Melvin Delbert, Nappanee.
Price, Willard A., Nappanee.

Randolph, Frank, Elkhart.
Sensenich, Aaron S., Wakarusa.
Sensenich, Roscoe Loyd, Wakarusa.
Stauffer, Walter Allen, Elkhart.
Stuckman, Edwin D., Nappanee.
Teters, B. F., Middlebury.
Vallette, William O., Goshen.
Wagner, Samuel Charles, Wakarusa.
Short, I. Wright, Elkhart.
Snapp, James A., Goshen.
Spohn, George W., Elkhart.
Walters, Sidney W., New Paris.
Whitmer, B. F., Goshen.
Work, Jas. A., Elkhart.
Yode, Albert C., Goshen.
Staufft, Hannah O., Elkhart.
Jennings, Harriet B., Elkhart.
Hagenbaugh, Elmer J., Elkhart.
Hoover, Enos M., Elkhart.
Ingalls, Albert T., Elkhart.
Potter, Charles B., Elkhart.
Porter, Jessie B., Elkhart.
Norris, Allen A., Elkhart.
Baer, S. W., Nappanee.

DENTISTS.

Adams, F. P., Elkhart.
Cummins, S. M., Elkhart.
Goebel, Wm. Elkhart.
Pounder, Malcolm, Elkhart.
Werner, J. F., Elkhart.
Zinn, G. E., Elkhart.

FAYETTE COUNTY.

OFFICERS.

U. C. Ambrose, President.
P. G. Carlisle, Vice-Pres.
R. H. Elliott, Sec.-Treas.
H. M. Lamberson, Delegate.

CENSORS.

U. C. Ambrose.
J. R. Mountain.
H. M. Lamberson.

MEMBERS.

Ambrose, U. C., Lyons Station.
Clark, Jediah H., Connersville.
Carlisle, Patrick G., Connersville.
Dale, Omar E., Connersville, R. R. 9.
Derbyshire, Ephriam, Connersville.
Dillman, Lurton D., Connersville.
Elliott, Roy H.
Gordon, Stanton E.
Hamilton, Samuel N., Connersville.
Hamilton, Eugene E., Connersville.
Lamberson, Harry M., Connersville.
Ludwick, Verner, Connersville.
Mountain, Joseph R., Connersville.
Mitchell, Frank T., Everton.
Phillips, W. R., Orange.
Sipe, Richard W., Orange.
Spillman, Frank J., Connersville.
Smith, J. A., Brownsville.
VanPelt, George F., Connersville.

REMOVED.

Worster, W. W., Connersville.

FLOYD COUNTY.

OFFICERS.

W. J. Leach, President.
William Moore, Vice-Pres.
Anna I. McKamy, Sec.-Treas.
John Hazlewood, Delegate.

CENSORS.

John Hazlewood.
H. S. Wolfe.
W. C. Winstandley.

MEMBERS.

Bird, J. E., New Albany.
Cannon, G. H., New Albany.
Cook, C. P., New Albany.
Davis, C. P., Galena.
Easley, E. P., New Albany.
Funk, C. C., New Albany.
Gaterer, J. A., New Albany.
Harris, Robt., New Albany.
Hazlewood, John, New Albany.
Leach, W. J. New Albany.
Maas, Alice M., New Albany.
McIntyre, C. W., New Albany.
McKaney, Anna I., New Albany.
Moore, Wm. New Albany.
Richards, Wm. R., New Albany.
Rutherford, R. L., New Albany.
Shacklett, H. B., New Albany.
Sigmon, E. L., New Albany.
Starr, W. L., New Albany.
Tebault, W. P., New Albany.
Weathers, J. F., New Albany.
Wilcox, F. H., New Albany.
Winstandley, W. C., New Albany.
Wolfe, H. S., New Albany.
Wray, John T., New Albany.

SUSPENDED.

Neat, T. C., New Albany.

FOUNTAIN COUNTY.

OFFICERS.

Louis A. Bolling, President.
C. G. Beckett, Vice-Pres.
George Rowland, Sec.-Treas.
Walter H. Dinsmore, Delegate.

CENSORS.

M. Petet.
Alva Spining.
W. H. Ross.

MEMBERS.

Beckett, C. G., Attica.
Bolling, Louis A., Attica.
Burlington, J. Roy, Attica.
Campbell, T. B., West Lebanon.
Case, Marion L., Attica.
DeLancey, S. S., Williamsport.
Dinsmore, Walter H., Kramer.
Evans, John M., Mellott.
Finney, Chas. J., Attica.
Holly, Albert C., Attica.
Kendall, Carey W., Pine Village.
Kirk, Elliott W., Veedersburg.
Meyers, C. L., Covington.
Pearlman, Samuel, Stone Bluff.
Petet, Marshall, Veedersburg.
Porter, George S., Williamsport.
Pugh, F. H., Williamsport.
Ross, W. H., Veedersburg.
Rowland, George, Covington.
Rupert, A. M., Attica.
Shoaf, F. A., Veedersburg.
Shining, A. L., Covington.
Walter, F. J., (Mudlavia) Kramer.

SUSPENDED.

Claypool, R. W., Newtown.
Sparks, Jos. T., Yeddo.

FRANKLIN COUNTY.

OFFICERS.

John W. McCammon, President.
Calvin Carter, Secretary.

MEMBERS.

Carter, Calvin, Brookville.
Clawson, J. W., Cedar Grove.
Gregory, Henry, Laurel.
McCammon, John W., Laurel.
Preston, A. L., Fairfield.

SUSPENDED.

Forry, B. F., Bath.

FULTON COUNTY.

OFFICERS.

C. L. Slonaker, President.
H. W. Taylor, Vice-Pres.
M. O. King, Sec.-Treas.
C. L. Slonaker, Delegate.

CENSORS.

H. W. Taylor.
W. S. Shafer.
M. O. King.

MEMBERS.

Slonaker, C. L., Leiter's Ford.
Johnson, A., Akron.
Ward, J. M., Kewanee.
Stinson, A. E., Athens.
Deilman, F. C., Fulton.
Richards, J., Fulton.
Scott, J. C., Talma.
Brown, A., Rochester.
Rhodes, E. E., Rochester.
Loring, C. J., Rochester.
Rannells, J. N., Rochester.
Shafer, W. S., Rochester.
Gould, C. E., Rochester.
Taylor, H. W., Rochester.
King, M. O., Rochester.

SUSPENDED.

Gilbert, A. I., Kewanee.

GIBSON COUNTY.

OFFICERS.

M. P. Hollingsworth, President.
G. C. Kendle, Vice-Pres.
A. L. Ziliak, Sec.-Treas.
A. L. Ziliak, Delegate.

CENSORS.

J. L. Morris.
V. H. Marchant.
J. W. McGowan

MEMBERS.

Arthur, H. M., Princeton.
Burton, A. R., Princeton.
Gudgel, Harry, Hazleton.
Hollingsworth, M. P., Princeton.
McGowan, J. N., Oakland City.
Marchant, V. H., Haubstadt.
Maxam, F. H., Princeton.
Montgomery, J. R., Owensville.
Montgomery, Martin, Owensville.
Morris, J. L., Kings.
Morris, W. F., Ft. Branch.
Strickland, George, Jenks, Oklahoma.
Swan, D. H., Francisco.
Wertz, T., Princeton.
Clark, J. I., Owensville.
Lindley, C. M., Princeton.
Ziliak, A. L., Princeton.
Clark, J. H., Princeton.
Cushman, R. A., Princeton.
Kindle, G. C., Princeton.
Ziliak, J. E., Haubstadt.
Mason, Geo. C., Oakland City.
Burlingame, Edwin G., Oakland City.
Anderson, R. S., Princeton.
Blair, W. W., Princeton.
Lowden, E. B., Hazleton.
Payne, F. M., Princeton.
Williamson, Wm. T., Ft. Branch.
Hopkins, W. G., Ft. Branch.
Diefendorff, C. F., Boonville.
Alexander, H. H., Princeton.
Martin, W. D., Oakland City.
Mason, Robt. S., Oakland City.
Smith, W. H., Oakland City.

SUSPENDED.

Mills, Mary, Princeton.
Moore, P. B., Owensville.
Sanders, J. M., Poneto.
Leister, Wm. L., Oakland City.
Critchfield, J. S., Princeton.

REMOVED.

Zimmermann, J., Lynnville.

DECEASED.

Blair, Frank, Princeton.

GRANT COUNTY.

OFFICERS.

B. C. Dale, President.
M. J. Lewis, Vice-Pres.
H. N. Swezey, Secretary.
M. T. Shively, Treasurer.
W. A. Fankboner, Delegate.

CENSORS.

J. W. Patterson.
O. W. McQuown.
J. A. Matteson.

MEMBERS.

Bechtol, C. O., Marion.
Black, W. C., Marion.
Bridge, L. M., Marion.
Buller, M. S., Gas City.
Cameron, V. V., Marion.
Conley, L. H., Gas City.
Crumrine, I. S. J., Landers.
Dale, B. C., Marion.
Daniels, G. R., Marion.
Daniels, G. W., Sweetzer.
Davis, A. T., Marion.
Eshelman, L. H., Marion.
Fankboner, W. A., Marion.
Flynn, Wm., Marion.
Fulenwider, H. L., Rigdon.
Harold, E. O., Marion.
Henley, Glen, Fairmount.
Holliday, D. A., Fairmount.
Holliday, L. D., Fairmount.
Jeffrey, H. S., Upland.
Johnson, J. E., Marion.
Kimball, G. D., Marion.
Knight, J. C., Jonesboro.
Lewis, M. J., Marion.
Lloyd, A. A., Marion.
McKay, J. D., Marion.
McQuown, O. W., Marion.
Mattison, J. A., Nat. Mil. Home.
Miller, Harry, Nat. Mil. Home.
Overman, C. J., Marion.
Patterson, J. W., Fairmount.
Powell, Nettie B., Marion.
Seaton, Albert, Nat. Mil. Home.
Shively, M. T., Marion.
Stout, O. L., Upland.
Swezey, H. N., Marion.
Taylor, D. B., Nat. Mil. Home.
Toney, J. M., Van Buren.
Troop, E. M., Marion.
Vance, C. E., Gas City.
Williamson, Harry, Marion.

REMOVED.

Babbitt, W. H., Marion.
Clark, N. W., Sweetser.
Whitson, J. S., Gas City.

DECEASED.

Dooley, A. J., Marion.
Matteson, D. E., Marion.

GREENE COUNTY.

OFFICERS.

John W. Gray, President.
B. M. Sherwood, Vice-Pres.
August F. Knoefel, Sec.-Treas.
August F. Knoefel, Delegate.

CENSORS.

L. A. Hyde.
H. R. Lowder.
J. E. Talbott.

MEMBERS.

Gray, J. W., Bloomfield.
Vansandt, F. A., Bloomfield.
Cole, W. H., Switz City.
Mallett, C. D., Switz City.
Harrah, J. M., Switz City.
Lowder, H. R., Bloomfield.
Lukenbill, L. C., Marco.
Jackson, J. M., Lyons.
Beatty, H. H., Worthington.
Shirtz, E., Lyons.
Cook, R. T., Solsberry.
Thayer, M. N., Linton.

Quillin, S. N., Linton.
Talbot, J. E., Linton.
Sherwood, B. M., Linton.
Knoefel, A. F., Linton.
Sherwood, E. T., Linton.
Hyde, L. A., Linton.
Pickel, J. U., Midland.
Rose, B. A., Linton.
Fleetwood, B., Linton.
Cravens, E. R., Linton.
Shanklin, V. S., Vicksburg.
Cravens, W. R., Bloomfield.
Lowder, C. M., Dugger, Sullivan Co.
Davis, W. N., Worthington.
Norval, H. B., Bloomfield.
Mason, E. R., Bloomfield.
Chambers, B. F., Lyons.

HAMILTON COUNTY.

OFFICERS.

H. H. Thompson, President.
L. J. Baldwin, Vice-Pres.
J. D. Sturdevant, Sec.-Treas.

MEMBERS.

Axline, J. A., Noblesville.
Bills, L. F., Atlanta.
Baldwin, L. J., Hortonville.
Dove, S. C., Westfield.
Fodrea, Z. H., Westfield.
Graham, W. B., Noblesville.
Hannah, J. E., Clarksville.
Haworth, M. E., Noblesville.
Hershey, F. C., Carmel.
Hershey, K. C., Carmel.
Loehr, E. C., Noblesville.
Ray, C. C., Arcadia.
Sturdevant, J. D., Noblesville.
Thompson, H. H., Noblesville.
Tomlinson, C. H., Cicero.
Tucker, A. R., Noblesville.
Tucker, F. A., Noblesville.
Wishard, E. E., Noblesville.
Washburn, H. A., Noblesville.
Camp, W. E., Clarksville.
Hicks, J. L., Arcadia.
Parr, J. N., Jolietville.

REMOVED.

Jones, Oscar, Jolietville.
McKinley, E. D., Atlanta.

HANCOCK COUNTY.

OFFICERS.

C. A. Barnes, President.
C. K. Bruner, Sec.-Treas.
Paul Trees, Delegate.

MEMBERS.

Barnes, C. A., Greenfield.
Bruner, C. K., Greenfield.
Bruner, Mary L., Greenfield.
Comstock, James A., Greenfield.
Ferrell, J. E., Eden.
Howard, Noble P., Greenfield.
Griffin, L. B., Greenfield.
King, Warren R., Greenfield.
Sisson, Ernest R., Greenfield.
Slocum, Stewart, Fortville.
Titus, Charles, Warrington.
Trees, Paul, Maxwell.
Allen, J., Charlottsville.
Justice, W. A., Greenfield.

DECEASED.

Selman, John W., Greenfield.

HARRISON COUNTY.

OFFICERS.

P. H. Schoen, President.
J. E. Lawson, Vice-Pres.
A. S. Neely, Sec.-Treas.

CENSORS.

J. C. Bottorff.
J. W. Baxter.
W. H. Bopp.

MEMBERS.

Funk, Z. T., Corydon.
Neely, J. L., Corydon.
Bottorff, J. C., Corydon.
Veach, W. O., Corydon Jct.
Bopp, W. H., New Salisbury.
Boston, Chas., Bradford.
Denbo, W. R., Mauckport.
Lawson, J. E., Corydon.
Daniel, Wm., Corydon.
Martin, Geo. H., Corydon.
Neely, A. S., Corydon.
Weaver, Amzi, Elizabeth.
Schoen, P. H., New Middletown.
Watson, Claud, New Middletown.
Wolfe, C. Z., Corydon.
Reader, W. H., New Amsterdam.
Baxter, J. W., Lanesville.
Wolfe, F. E., Lanesville.

SUSPENDED.

Briscoe, C. E., Depauw.
Byrne, J. D., New Salisbury.
Davis, W. H., Corydon.
Dean, D. L., Elizabeth.
Glenn, L. F., Crandall.
Hurst, S. H., Laconia.

HENDRICKS COUNTY.

OFFICERS.

Geo. G. Allred, President.
Wm. H. Terrell, Vice-Pres.
Wilson T. Lawson, Sec.-Treas.
D. M. Reynolds, Delegate.

CENSORS.

W. J. Hoadley.
J. T. Barker.
Jno. S. Ragan.

MEMBERS.

Allred, Geo. G., Danville.
Barker, Joel T., Danville.
Barker, Thom R., Danv lle.
Cooper, Ernest, Plainfield.
Davidson, A. W., Brownsburg.
Hicks, F. L., Stilesville.
Hunt, Stephen, Coatsville.
Jones, Rilus E., Clayton.
Jessup, Maria A., Friendswood.
Lawson, W. T., Danville.
Marsh, Jno. L., Brownsburg.
McClintock, C. W., Pittsboro.
Osborn, John A., Pittsboro.
Ragan, John S., Plainfield.
Reynolds, D. M., Clayton.
Royer, E. Ray, North Salem.
Smith, Thomas G., Brownsburg.
Summers, H. C., Arno.
Terrell, W. H. H., Pittsboro.
Titus, E. L., Lizton.
White, C. A., Danville.
Adams, T. J., North Salem.
Williams, Luther, Coatsville.
Hoadley, W. J., Danville.
Carter, Amos, Plainfield.
Faraber, C. E., Indianapolis.
O'Brien, Wm. M., Danville.

REMOVED.

Osborn, Harry, Indianapolis.

SUSPENDED.

O'Brien, B. M., New Winchester.

HONORARY.

Parker, M. G., Danville.

HENRY COUNTY.

OFFICERS.

G. H. Smith, President.
F. L. Thornburg, Vice-Pres.
J. A. Tully, Sec.-Treas.

CENSORS.

E. S. Ferris.
E. H. Brubaker
H. W. Griest.

MEMBERS.

Bartlett, C. G., Lewisville.
Benedict, H., Springport.
Blossom, J. C., Mt. Summit.
Brubaker, E. H., New Castle.
Davis, E. J., Mooreland.
Englerth, J. T., Honey Creek.
Ferris, E. S., New Castle.
Griest, H. W., New Castle.
Gronendyke, T. W., New Castle.
Gronendyke, O. J., New Castle.
Hess, F. C., Cadiz.
Hestler, O. J., Blountsville.
Holloway, O. E., Knightstown.
Hiatt, J. E., New Castle.
Koons, H. H., New Lisbon.
Mendenhall, E. T., New Castle.
Misener, W. L., Mechanicsburg.
Paul, J. O., New Castle.
Post, B. O., Sulphur Springs.
Shannon, J. B., Greensboro.
Smeltzer, S. G., Shirley.
Smith, Geo. H., Knightstown.
Stuart, Robert, Spiceland.
Thornburg, F. L., Middletown.
Tully, J. A., Millville,
VanMatre, C. E., New Castle.
Wallage, Geo. W., Middletown
Waters, S. C., Middletown.
Van Nuys, W. C., New Castle
Kirk, C. E., Spiceland.
Hardesty, J. C., New Castle
Canady, C. E., New Castle.

SUSPENDED.

Stout, Chas. M., Middletown
Wilson, Ralph, Shirley.

DECEASED.

Boor, W. T., New Castle.
McShurley, J. L., Sulphur Springs.

HOWARD COUNTY.

OFFICERS.

L. Deweese, President.
G. C. Maughmer, Vice-Pres.
O. D. Hutto, Secretary.
C. J. Adams, Treasurer.
Edgar Cox, Delegate.

CENSORS.

J. H. Ross.
Edgar Cox.
J. W. Wright

MEMBERS.

Adams, C. J., Kokomo.
Brubaker, E. H., West Middleton.
Carnelly, J. H., Kokomo.
Chancellor, S. R., Kokomo.
Chittick, Andrew, Burlington.
Cox, Edgar, Kokomo.
Cochran, T. C., Kokomo.
Deweese, L., Hemlock.
Garr, J. O., Kokomo.
Hamilton, N. C., Kokomo.
Harrison, Wm. H., Kokomo.
Hutto, O. D., Kokomo.
Kemp, O. P., Center.
Kern, L., Kokomo.
McClurg, Wm. H., Kokomo.
Martin, A. A., Kokomo.

Martin, W. H., Kokomo.
Martin, Will J., Kokomo.
Maughmer, G. C., Kokomo.
Miller, H. C., Greentown,
Miller, Arthur, Russiaville.
Moore, Emma W., Kokomo.
Moulder, J. McClean, Kokomo.
Peters, D. C., Greentown.
Powell, E. U., Greentown.
Puckett, J. L., Kokomo.
Ross, J. H., Kokomo.
Ross, R. H., Cassville.
Scott, R. F., Kokomo.
Scott, W. I., Kokomo.
Simmons, L. A., Kokomo.
Smith, R. H., Kokomo.
Varner, R. D., Kokomo.
Wright, J. W., Kokomo.

HONORARY.

Kern, L., Kokomo.
Thorne, J. C., Kokomo.

DECEASED.

Friermood, E. K., Greentown.

HUNTINGTON COUNTY.

OFFICERS.

H. K. McIlvain, President.
C. H. Good, Vice-Pres.
Ervin Wright, Sec.-Treas.
Chas. L. Wright, Delegate.

CENSORS.

E. T. Dippell.
C. H. Good.
J. M. Hicks.

MEMBERS.

Black, C. M., Warren.
Chafee, W. C., Huntington.
Dippell, E. T., Huntington.
Fisher, E. S., Markle.
Fry, C. W., Huntington.
Frost, R. F., Huntington.
Ferguson, A. M., Huntington.
Grayston, B. H. B., Huntington.
Grayston, C. E., Huntington.
Grayston, F. W., Huntington.
Good, C. H., Warren.
Hunter, J. R., Huntington.
Hicks, J. M., Huntington.
Koontz, S., Roanoke.
Kemp, J. W., Roanoke.
Krebs, M. H., Huntington.
Morgan, F. B., Huntington.
McIlvain, H. K., Huntington.
Nelson, O. O., Huntington.
Nichols, W. E., Andrews.
Northrup, A. H., Markle.
O'Leary, G. M., Huntington.
Perry, I. E., Bippus.
Poinier, W. E., Andrews.
Sprowl, J. S., Warren.
Scott, N. W., Huntington.
Shaffer, A. H., Huntington.
Taviner, R. Q., Huntington.
Thomas, M. H., Huntington.
Wright, Ervin, Huntington.
Wright, C. L., Huntington.
Wilking, S. V., Roanoke.
Wimmer, E. G., Mt. Etna.
Clokey, M. C., Huntington.

JACKSON COUNTY.

OFFICERS.

Geo. H. Kamman, President.
Blaine Empson, Vice-Pres.
A. G. Osterman, Sec.-Treas.
L. B. Hill, Delegate.

CENSORS.

J. K. Ritter.
A. May.
M. F. Gerrish.

MEMBERS.

Barnes, Geo. O., Seymour.
Cummings, D. J. Sr., Medora.
Cummings, D. J. Jr., Ewing.
Empson, Blaine, Dudleytown.
Gerrish, M. F., Seymour.
Gillespie, C. E., Crothersvillle.
Graessle, G. G., Seymour.
Harrod, Nelson, Tampico.
Heller, Fred, Brownstown.
Hill, L. B., Seymour.
Jenkins, J. M., Cortland.
Kamman, G. H., Seymour.
May, Albert, Crothersville.
Osterman, A. G., Seymour.
Ritter, J. K., Seymour.
Ruddick, F., Seymour.
Shields, J. M., Seymour.
Abel, Virgil, Vallonia.
Luckey, H. R., Seymour.

REMOVED.

Washburn, H. H., Freetown.

JAY COUNTY.

OFFICERS.

M. T. Jay, President.
E. C. Garber, Vice-Pres.
Harriet Wiley, Sec.-Treas.
C. E. Caylor, Delegate.

CENSORS.

J. T. Dickes.
C. W. Mackey.
R. E. Brokaw.

MEMBERS.

Bloxsome, A. W., Pennville.
Bockoven, C., Briant.
Bockoven, S. Marion, Briant.
Brockaw, R. E., Portland.
Caylor, C. E., Pennville.
Chaney, G., Portland.
Dickes, J. T., Portland.
Earp, R. B., Dunkirk.
Garber, E. C., Dunkirk.
Garber, J. B., Dunkirk.
Hall, J. W., Portland.
Jay, M. T., Portland.
Mackey, C. W., Portland.
Mason, Samuel, Pennville.
Metts, C. C., Redkey.
Moyer, F. E., Pennville.
Murray, D. P., Dunkirk.
Paddock, C. H., Portland.
Perry, G. L., Portland.
Schwartz, W. D., Portland.
Shepherd, G. W., Redkey.
Sims, I. G., Portland.
Walker, W. H., Portland.
Wiley, Harriet, Portland.

JEFFERSON COUNTY.

OFFICERS.

J. H. Calvert, President.
Geo. C. Lewis, Vice-Pres.
J. Cooperider, Sec.-Treas.
C. C. Copeland, Delegate.

CENSORS.

R. W. Cochran.
V. Shepherd.
J. H. Christie.

MEMBERS.

Austin, F. H., North Madison.
Calvert, J. H., Milton, Ky.
Christie, J. H., Canaan.
Cochran, R. W., Madison.
Cooperider, J., Madison.
Copeland, C. C., North Madison.
Denny, Geo. E., Madison.
Denny, Chas., Belleview.
Graham, N. P., Madison.
Hampton, S. E., Milton, Ky.
Harwood, Chas. P., Milton, Ky.
Henning, Carl, Hanover.
Kremer, N. A., Madison.
Mathews, W. R., China.
McKeand, R. A. J., Lexington.
Ryker, Charles, Manville.
Shepperd, V., Dupont.
Sherlock, J. H., Madison.
Totten, Evan, Madison.
Whitsett, S. A., Kent.
Williams, C. F., Madison.

DECEASED.

Lewis, Geo. C., Madison.

JENNINGS COUNTY.

OFFICERS.

W. A. Wildman, President.
C. C. McFarlin, Vice-Pres.
W. H. Stemm, Sec.-Treas.
W. J. Mitchell, Delegate.

CENSORS.

D. R. Saunders.
D. W. Robertson.
W. H. Richardson.

MEMBERS.

Adams, S. D., Brewersville.
Davenport, H. F., North Vernon.
Case, W. W., Zenas.
Fuller, W. H., North Vernon.
Gaddy, O., Paris Crossing.
Green, J. H., North Vernon.
McFarlin, C. C., Zenas.
Martin, F. A., Commisky.
McGlure, J. W., Butlerville.
Mitchell, W. J., North Vernon.
Richardson, W. H., Vernon.
Robertson, D. W., Deputy.
Shott, D. R., Nebraska.
Saunders, D. R., North Vernon.
Stemm, W. H., North Vernon.
Wildman, W. A., San Jacinto.
Wilson, W. L., Scipio.

REMOVED.

Love, J. R., Zenas.

JOHNSON COUNTY.

OFFICERS.

D. L. Phipps, President.
J. M. Wallace, Sec.-Treas.
L. L. Whitesides, Delegate.

CENSORS.

R. D. Willan.
Z. Carnes.
P. K. Dobyns.

MEMBERS.

Carnes, Z., Greenwood.
Sheek, D. W., Greenwood.
Craig, J. A., Greenwood.
Phipps, D. L., Whiteland.
Terhune, R. W., Whiteland.
Elliott, R. M., Needham.
Repass, Robert, Smith's Valley.
Willan, R. D., Trafalgar.
Hall, A. J., Franklin.
Lanam, J. H., Franklin.
Wallace, B., Franklin.
Whitesides, G. G., Franklin.
Dobyns, P. K., Franklin.
Wallace, J. M., Franklin.

KNOX COUNTY.

OFFICERS.

N. E. Beckes, President.
J. D. McDowell, Vice-Pres.
C. L. Boyd, Secretary.
C. E. Stewart, Treasurer.

CENSORS.

W. H. Davenport.
L. B. Staley.
Royse Davis.

MEMBERS.

Beard, S. C., Vincennes.
Benham, C. W., Vincennes.
Beckes, N. E., Vincennes.
Bowers, Eugene, Vincennes.
Boyd, C. L., Vincennes.
Bryan, E. A., Vincennes.
Buley, D. M., Vincennes.
Amey, W. E., Bicknell.
Caney, P. H., Vincennes.
Davenport, W. H., Vincennes.
Davis, Royse, Decker.
Downey, L. J., Vincennes.
Glenn, Marion, Vincennes.
Held, H. W., Vincennes.
Hoover, L., Decker.
Jones, I. G., Vincennes.
Johnson, M. A., Oaktown.
Kessinger, W. E., Sandborn.
Knapp, Geo., Vincennes.
Masganna, Emmanuel, Vincennes.
Maxedon, T. H., Vincennes.
McCoy, J. N., Vincennes.
McDowell, M. M., Vincennes.
McDowell, J. D., Vincennes.
McGowan, T. J., Vincennes.
Ramsey, J. P., Vincennes.
Reeve, J. T., Edwardsport.
Robinson, J. T., Wheatland.
Small, E. T., Decker.
Smadel, J. W., Vincennes.
Staley, L. B., Bicknell.
Staley, T. M., Bicknell.
Stewart, C. E., Vincennes.
Swartzel, J. A., Indianapolis.
Somes, J. T., Vincennes.
Trueblood, I. W., Monroe City
Moore, M. G., Vincennes.
McIntosh, John J., Vincennes.
Hall, Silas, Vincennes.
Boal, Wm. P., Sandborn.
Anderson, John B., Vincennes

HONORARY.

Smith, H. M., Vincennes.

KOSCIUSKO COUNTY.

OFFICERS.

C. R. Long, President.
A. C. McDonald, Vice-Pres.
C. A. Underwood, Sec.-Treas.
J. M. Amiss, Delegate.

CENSORS.

C. W. Burket.
C. E. Leedy.
P. G. Fermier.

MEMBERS.

Amiss, J. M., Silver Lake.
Lecrone, Ira, Silver Lake.
Carey, N. Austin, Silver Lake.
Shackelford, T. J., Warsaw.
McDonald, A. C., Warsaw.
Howard, C. N., Warsaw.
Hines, W. L., Warsaw.
Bash, J. M., Warsaw.
Hoy, B. F., Syracuse.
Ford, L. W., Syracuse.
Lyons, J. H., North Webster.
Potter, J. E., Milford.

Long, C. R., Pierceton,
Leedy, C. E., Pierceton.
Anglin, G. W., Warsaw.
Underwood, C. A., Warsaw.

SUSPENDED.

Burket, C. W., Warsaw.
Chase, E. L., North Webster.
Clutter, T. J., Atwood.
Dunfie, J. W., Etna Green.
Fermin, P. G., Leesburg.
Leiter, W. S., Claypool.
Nehrbas, J. G., Winona Lake.
Rowe, A. M., Warsaw.
Schoenover, W. R., Warsaw.
Thomas, Ch. E., Leesburg.
Warvel, J. L., Sidney.
Yocum, M. G., Mentone.

DECEASED.

Hines, L. A., Warsaw.
Webber, I. B., Warsaw.

LAGRANGE COUNTY.

OFFICERS.

Chas. W. Dancer, President.
J. E. Rarick, Vice-Pres.
D. W. Dryer, Sec.-Treas.
S. H. Schrock, Delegate.

CENSORS.

A. R. Wyatt.
A. G. Grubb.
I. J. Vaughan.

MEMBERS.

Broughton, F. H., Wolcottville.
Cook, Wm. M., LaGrange.
Dancer, C. W., Stroh.
Dryer, D. W., LaGrange.
Eash, S. M., Shipshewana.
Ferguson, W. A., Brighton.
Fowler, W. E., Scott.
Grubb, A. S., Mongo.
Hildebrand, W. O., Topeka.
Hostetter, A. J., LaGrange.
Newman, H. M., South Milford.
Quick, S. S., Brighton.
Rarick, E. E., Wolcottville.
Schrock, H. W., LaGrange.
Schrock, O. L., LaGrange.
Schrock, S. H., LaGrange.
Schrock, J. J., Alto.
Short, Wm. H., LaGrange.
Short, J. L., LaGrange.
Vaughan, I. J., Topeka.
Wade, F. C., Lima.
Wyatt, A. R., LaGrange.
Youngkin, J. W., Wolcottville.

HONORARY.

Lake, Geo. B., Wolcottville.
Rarick, John H., LaGrange.

LAKE COUNTY.

OFFICERS.

W. F. Howat, President.
Geo. Hoskins, Vice-Pres.
H. E. Sharrer, Sec.-Treas.
E. M. Wells, Delegate.

CENSORS.

C. W. Campbell.
E. M. Shanklin.
A. J. Lauer.

MEMBERS.

Brannon, L. D., Crown Point.
Buchanan, W. A., Hammond.
Chevegney, J. A. J., Dyer.
Campbell, C. W., Hammond.
Chidlaw, B. W., Hammond.
Clark, J. T., Hammond.
Dewey, E. L., Whiting.
Gibbs, J. C., Crown Point.

Howat, F. W., Hammond.
Hoskins, George, Whiting.
Kelley, L. H., Hammond.
Kohr, T. W., Hammond.
Lauer, A. J., Whiting.
Noble, Sarah, East Chicago.
Oberlin, T. W., Hammond.
Putnam, W. E., Whiting.
Pannenborg, J. C., Hammond.
Ross, A. A., East Chicago.
Scull, Eleanor, Hammond.
Shanklin, E. M., Hammond.
Schleicher, A. G., East Chicago.
Sharrer, H. E., Hammond.
Spear, Robert, East Chicago.
Lake, J. F., Valparaiso.
Teagarden, J. A., Indiana Harbor.
Ainsley, R., Indiana Harbor.
Hughes, W. L., Indiana Harbor.
Robinson, C. C., Indiana Harbor.
Sauer, F. W., Indiana Harbor.
Weis, Wm. D., Hammond.
Wells, E. M., Whiting.
Willetts, A. J., Hammond.
Button, C. E., Montana.
Stauffer, E. R., Hammond.
Vaughn, Martin, Hammond.

SUSPENDED.

Gordon, E. R., Hobart.

LAPORTE COUNTY.

OFFICERS.

Whitefield Bowers, President.
J. S. Martin, Vice-Pres.
J. Lucius Gray, Secretary.
E. G. Blinks, Treasurer.
Whitefield Bowers, Delegate.

CENSORS.

J. Lucius Gray.
F. V. Martin.
J. B. Rogers.

MEMBERS.

Annis, E. L., Laporte.
Bacon, V. V., Michigan City.
Blinks, E. G., Michigan City.
Bowell, B. C., Laporte.
Bowers, W., Michigan City.
Buck, D. A., Laporte.
Cleveland, Chas. W., Michigan City.
Crawford, E. F. W., Hanna.
Dresher, M. L., Michigan City.
Eberhardt, W., Michigan City.
Gray, J. L., Laporte.
Hollenbeck, B. W., Westville.
Kerrigan, J. J., Michigan City.
Ledbetter, J. R., Michigan City.
Leeds, F. R., Michigan City.
Long, H. H., Laporte.
Mallone, B. E., Laporte.
Martin, F. V., Michigan City
Martin, H. H., Laporte.
Martin, J. S., Rolling Prairie.
McGrew, F. A., Laporte.
Meyer, J. H. Wm., Laporte.
Milligan, J. W., Michigan City.
Rogers, J. B., Michigan City.
Short, R. B., Union Mills.
Smith, M. S., Laporte.
Sutherland, O. L., Laporte.
Thompson, A. J., Laporte.
Tillotson, A. G., Michigan City.
Warren, F. R., Michigan City.
Wilcox, F. T., Laporte.
Wilson, H. W., Michigan City.
Wilson, L. A., Kingsbury.
Johnson, C. E., Otis.

REMOVED.

Campbell, H. M.
Irey, D. R.

LAWRENCE COUNTY.

OFFICERS.

E. L. Perkins, President.
F. E. Stipp, Vice-Pres.
Riley Shrum, Sec.-Treas.
J. T. McFarlin, Delegate.

CENSORS.

J. B. Duncan.
J. T. Freeland.
A. W. Dierking.

MEMBERS.

Andrews, John R., River Vale.
Bare, Addison W., Bryantsville.
Bullitt, Thomas W., River Vale.
Byrnes, James D., Mitchell.
Dierking, A. W., Oolitic.
Dings, W. H., Mitchell.
Donica, Thomas M., Bedford.
Duncan, J. B., Bedford.
Emery, Charles H., Bedford.
Freeland, John T., Bedford.
Gibbons, George L., Huron.
Gibbons, John A., Mitchell.
Harnocker, S. D., Silverville.
Hunter, Freeman S., Bedford.
Kelly, John C., Mitchell.
McDonald, A. J., Bedford.
McFarland, John T., Williams.
Mitchell, E. E., Avoca.
Perkins, Edward L., Oolitic.
Rariden, Charles E., Bedford.
Sherwood, Walter C., Mitchell.
Short, Richard B., Bedford.
Shrum, Riley, Bedford.
Smith, Spencer W., Leesville.
Smith, Wm. H., Bedford.
Stipp, F. E., Bedford.
Voyles, Harney, Bedford.
Walls, George W., Mitchell.
White, George W., Mitchell.
Woolery, Perry, Heltonville.

REMOVED.

Pearson, John R., Bedford.

MADISON COUNTY.

OFFICERS.

F. G. Kellar, President.
L. E. Alexander, Vice-Pres.
Thos. M. Jones, Sec.-Treas.
G. A. Whitledge, Delegate.

CENSORS.

B. H. Cook.
W. A. Boyden.
T. O. Armfield.

MEMBERS.

Austin, M. A., Anderson.
Austin, W., Summitville.
Alexander, L. E., Pendleton.
Armington, J. C., Anderson.
Armfield, J. D., Elwood.
Armfield, T. O., Elwood.
Boram, E. V., Anderson.
Boyden, William A., Anderson.
Brownback, O. W., Pendleton.
Charles, Etta, Summitville.
Chittenden, E. W., Anderson.
Cook, John W., Pendleton.
Conrad, Ernest M., Anderson.
Collins, Albert W., Anderson.
Coverston, John W., Frankton.
Cook, Harry B., Anderson.
Cotton, C. C., Elwood.
Crismond, J. W., Anderson.
Druley, Oren E., Anderson.
Fairfield, W. M., Anderson.
Fattic, J. B., Anderson.
Garretson, Wm. M., Perkinsville.
Gibson, John L., Alexandria.
Ginn, L. F., Elwood.

Hall, Joseph E., Alexandria.
Harter, J. H., Anderson.
Harter, W. P., Anderson.
Hunt, Lee F., Anderson.
Jones, Horace E., Anderson.
Jones, Thos. M., Anderson.
Kellar, I. G., Alexandria.
Kneale, W. W., Anderson.
Long, J. A., Anderson.
McWilliams, O. E., Anderson.
Longanecker, E. W., Anderson.
Miley, I., Anderson.
Meiner, J. A., Alexandria.
Manring, N. H., Elwood.
Merson, U. H., Anderson.
Mendenhall, F. F., Elwood.
Mobley, L. F., Summitville.
Newlin, S. C., Anderson.
Norris, S. C., Anderson.
Otto, A. E., Alexandria.
O'Neil, Thos., Anderson.
Perce, B. H., Anderson.
Plough, M. L., Elwood.
Quickel, D. S., Anderson.
Runyan, C. P., Elwood.
Rush, M. A., Anderson.
Stanford, H. H., Lapel.
Stewart, Jonas, Anderson.
Stephenson, T. J., Lapel.
Stoddard, J. M., Anderson.
Stone, F. L., Pendleton.
Saunders, Joseph, Anderson.
Terrill, L. B., Anderson.
Tobias, A. W., Elwood.
Whiteledge, G. A., Anderson.
Williams, L. O., Anderson.
Williams, Chas., Anderson.
Walser, J. A., Anderson.
Wood, N. S., Anderson.
White, J. W., Summitville.
Wilson, S. C., Anderson.

HONORARY.

Chittenden, G. F., Anderson.

REMOVED.

Leib, Alfa, Anderson.

INDIANAPOLIS (MARION COUNTY) MEDICAL SOCIETY.

OFFICERS.

O. G. Pfaff, President.
A. S. Jaeger, Vice-Pres.
R. H. Ritter, Sec.-Treas.
E. D. Clark, Delegate.
T. B. Noble, Delegate.

CENSORS.

A. W. Brayton.
David Ross.
L. C. Cline.
A. C. Kimberlin.
H. O. Pantzer.
T. B. Eastman.

MEMBERS.

Alexander, E. S., 1214 Oliver Ave.
Alexander, Joseph C., 219 N. Claypool Bldg.
Allen, Horace R., 1320 N. Del.
Allen, Wesley, West Newton.
Anderson, D. A., N. Claypool Bldg.
Ayers, A. S., N. Claypool Bldg.
Bahr, Max A., Central Insane Hospital.
Barnes, Arthur L., Southport.
Barnhill, John F., 323 N. Delaware.
Bates, J. M., Broad Ripple.
Beck, Wm. S., 18 W. Market.
Beckman, Henry F., 615 S. Noble.
Bell, Guido, 431 E. Ohio.
Berauer, J. M., 1353 Madison.
Berner, Louis E., 949 Prospect.
Bower, John V., Millersville.
Brayton, A. W., 330 N. Claypool Bldg.
Brayton, Nelson D., 330 N. Claypool Bldg.
Berry, D. F., Pythian Bldg.
Brill, James H., 680 N. New Jersey.
Brown, Benj. A., 3712 E. 25th.

Brown, Ed. A., 1066 Virginia.
Burckhardt, Louis, 33 Willoughby Bldg.
Carson, L. O., Traders' Point.
Chamberlin, Cameron, 3307 E. 10th.
Chappell, R. S., 229 E. Sixteenth.
Charlton, F. R., 23 Willoughby Bldg.
Christian, Wilmer, 532 N. Claypool Bldg.
Clark, Edmund D., 407 N. Claypool Bldg.
Clevenger, Wm. F., 229 N. Penn.
Cline, Lewis C., 20 Willoughby Bldg.
Cole, A. M., 401 N. Claypool Bldg.
Conger, Chas. W., 865 Mass. ave.
Cook, Chas. J., 598 N. Keystone.
Cook, George J., 28 Willoughby Bldg.
Cottingham, Chas. E., 216 Newton Claypool Bldg.
Courtney, Thos. E., 533 E. South.
Crose, Samuel E., 219 W. Wash.
Cunningham, Jno., 2225 N. Illinois.
Combs, G. W., 235 N. Penn.
Davis, John Q., 37 Willoughby Bldg.
DeHass, T. W., 8 McLean Place.
Denson, H. A., 308 Van Vorhis Bldg.
Dodds, W. T. S., 342 N. Claypool Bldg.
Dorsey, Francis O., 212 N. Claypool Bldg.
Dubois, E. J., 111 W. St. Clair.
Dunlavy, I. E., 1735 College.
Dugan, Thos. J., 2520 W. Wash.
Durham, C. O., 602 S. Illinois.
Earp, Samuel E., 24½ Kentucky.
Eastman, J. Rilus, 331 N. Del.
Eastman, Thos. B., 331 N. Del.
Edenharter, George F., Central Insane Hospital.
Erdman, Bernhard, 430 N. Claypool Bldg.
Ferguson, C. E., 327 N. Claypool Bldg.
Fletcher, C. I., 713 S. Meridian.
Ford, J. H., 226 N. Claypool Bldg.
Ford, Katherine C., 1111 W. New York.
Foreman, William H., 1716 E. Washington.
Fosler, D. W., 443 Highland ave.
Foxworthy, Frank W., 316 North Meridian.
Freeland, John L., City Hospital.
Fry, B. C., 401 Newton Claypool Bldg.
Furniss, S. A., 132 W. New York.
Gabe, Harry E., 911 Virginia.
Garshweiler, W. P., 160 E. Market.
Garstang, R. W., 226 N. Claypool Bldg.
Gemmel, Harry C., 31st and Northwestern.
Goar, C. S., 1134 S. Meridian.
Garrett, John D., 1733 N. Senate.
Graham, A. B., 27 Willoughby Bldg.
Graham, Hannah M., 11 Marion Block.
Hamer, Homer G., 529 Newton Claypool Bldg.
Haslep, Marie, 43 Willoughby Bldg.
Hays, Franklin W., 247 N. Penn.
Heath, Frederick C., 427 N. Claypool Bldg.
Hoag, W. I., 2625 W. Washington.
Hobbs, Alice L., 217 W. Eleventh.
Hodges, E. F., 2 W. New York.
Hodges, Fletcher, 2 W. New York.
Hood, Thomas C., 316 N. Meridian.
Hoskins, Walter D., 610 Newton Claypool Bldg.
House, G. H. F., 3015 N. Illinois.
House, John W., 2304 Talbott.
Hughes, William F., 950 S. Meridian.
Hurty, John N., State House.
Hutchins, F. F., 809 N. Alabama.
Hatfield, S. J., 2507 Gale st.
Hon, A. W., 19 W. Ohio.
Hiestand, H. J., Deaconess Hospital.
Jaeger, A. S., 433 N. Claypool Bldg.
Jackson, G. B., 540 N. Penn.
Jameson, Henry, 212 N. Claypool Bldg.
Jennings, W. L., Bridgeport.
Jobes, Norman E., 610 N. Claypool Bldg.
Johnson, W. H., Brightwood.
Johnston, S. A., 333 N. Claypool Bldg.
Kahn, David L., 323 N. Delaware.
Keene, T. V., 1222 N. Illinois.
Kennedy, Bernays, 333 N. Claypool Bldg.
Kimberlin, A. C., 47 Willoughby Bldg.
Kiser, Edgar F., 107 E. 22d.
Knabe, Helene, 1151 Bates.

Knox, E. S., 1404 Hoyt.
Kolmer, John, 17 W. Ohio.
Kyle, John J., 226 N. Claypool Bldg.
Kahlo, G. D., French Lick.
Keeney, S., 509 Prospect.
Kelley, W. F., 5552 E. Wash.
Ketcham, Jane M., 319 N. Penn.
Langdon, Harry K., 2454 Central.
Layman, Daniel W., 308 N. Claypool Bldg.
Leathers, D. A., 1017 College.
Lee, Geo. W. H., 2733 Kenwood ave.
Leonard, Henry S., 1203 E. Nineteenth.
Link, Goethe, 743 Virginia.
Lohrman, Henry, 427 N. Claypool Bldg.
Long, John B., 760 W. New York.
Lukenbill, O. G., 2219 E. Wash.
McAlexander, R. O., 405 E. 16th.
McConnell, Maude W., 902 S. East.
McDonald, J. A., Central Insane Hospital.
McDonald, W. B., New Augusta.
McLeay, J. D., 11-12 Masonic Tem.
Malpas, S. H., Hume Bldg.
Martin, Paul F., The Willoughby.
Marxer, C. W., 501 E. McCarty.
Masters, John L., 249 N. Penn.
Maxwell, Allison, 323 N. Delaware.
Medsker, Irwin T., 2618 W. Mich.
Moore, H. A., 318 N. Claypool Bldg.
Morris, John E., 428 E. Nebraska.
Morrison, Frank A., 13 Willoughby Bldg.
Morrow, Joseph E., Van Vorhis Bldg.
Moschell, J. D., Fair Block.
Neier, O. C., 5502 E. Washington.
Neu, Chas. F., Insane Hospital.
Noble, Thos. B., 427 N. Claypool Bldg.
Oliver, John H., 422 N. Delaware.
Ostroff, Henry, 182 W. Market.
Outland, Edgar M., 547 N. Claypool.
Page, Lafayette, 30 Willoughby Bldg.
Pantzer, Hugo O., 40 Willoughby Bldg.
Payne, J. H., Julietta, Ind.
Petersdorf, Gustav A., 508 Parkway.
Pettijohn, Fred L., 524 E. 21st.
Pfaff, John, 333 N. Claypool Bldg.
Pfaff, O. G., 333 N. Claypool Bldg.
Pfafflin, Chas. A., 443 N. Claypool Bldg.
Phipps, J. M., Van Vorhis Bldg.
Potter, Theodore, 610 N. Claypool Bldg.
Reed, J. V., The Willoughby.
Reyer, E. C., 311 N. Claypool Bldg.
Ridpath, H. W., 642 E. 16th.
Ritter, C. L., 232 N. Claypool Bldg.
Ritter, R. H., 47 Willoughby Bldg.
Robertson, John F., 2313 E. Mich.
Robinson, W. B., 53 Willoughby Bldg.
Ross, David, 12 Willoughby Bldg.
Ross, R. O., City.
Row, Geo. S., 401 N. Penn.
Schaefer, C. R., 1202 Madison.
Scherer, S. C., 513 N. Delaware.
Schneck, Luella M., 249 N. Penn.
Scott, John T., 634 N. Claypool Bldg.
Schneider, A. J., 1640 S. Meridian.
Stuart, John D., 2101 Central Ave.
Sharp, Walter N., 408 N. Claypool Bldg.
Shipp, Floyd N., 323 N. Delaware.
Sigler, Geo. A., 347 N. Claypool Bldg.
Sluss, J. W., 216 N. Claypool Bldg.
Smith, Martha J., 415 N. Delaware.
Sommer, E. F., 406 N. California.
Sowder, Chas. R., 323 N. Delaware.
Spencer, M. J., 3540 E. Wash.
Spink, Mary A., 1140 E. Market.
Spink, Urbana, 1140 E. Market.
Sterne, A. E., 1820 E. 10th.
Stillson, J. O., 440 N. Pennsylvania.
Stockton, Sarah, Insane Hospital.
Sterch, L. A. E., 1342 S. Meridian.
Sutcliffe, John A., 7 Baldwin Bldg.
Taylor, James H., The Chalfant.
Thompson, J. L., 232 N. Illinois.
Truitt, F. L., 215 E. New York.
Thomas, E. C., N. Claypool Bldg.
Thorner, Moses, The Willoughby.
Thurston, H. S., 224 N. Meridian.
Todd, Robert N., 2117 N. Capitol.
Tomlin, W. S., 320 N. Claypool Bldg.
Torian, O. N., 3002 N. Illinois.
Turner, Harriet E., 401 N. Penn.
Wagner, T. A., 148 N. Delaware.

Wallace, Lew E., 232 N. Illinois.
Ward, A. O., 339 Virginia.
Ward, Clay L., 1475 E. New York.
Ward, Joseph Henry, 437½ Indiana.
Watters, Patrick J., Central Insane Hospital.
Weer, H. H., 12 Willoughby Bldg.
Weil, Harry J., 2103 E. Michigan.
Wheeler, H. H., 1535 N. Illinois.
Willis, Edw. A., The Chalfant.
Wilson, A. L., 1520 N. Capitol.
White, C. S., 809 W. 30th.
Woodbury, H. E., 1512 N. Delaware.
Wishard, W. N., 529 N. Claypool Bldg.
Wolferman, A. Gertrude, 433 Va.
Woolen, Green V., 20 W. Ohio.
Woolen, Herbert M., 20 W. Ohio.
Wynn, Frank B., 311 N. Claypool Bldg.
Young, James B., Indianapolis.

HONORARY.

Anthony, James R., Indianapolis.
Avery, J. P., Indianapolis.
Chatard, Rt. Rev. Bishop, Indianapolis.
Comingor, J. A., Indianapolis.
Ferguson, F. C., Indianapolis.
Field, M. H., Indianapolis.
Furniss, Henry W., Bahia, Brazil.
Hacker, T. S., Indianapolis.
Jameson, P. H., Indianapolis.
Jeffries, William E., Indianapolis.
Kemper, G. W. H., Muncie.
Kitchen, J. M., Indianapolis.
McNab, P., Indianapolis.
Moore, S. H., Indianapolis.
Patterson, A. W., Indianapolis.
Ryan, W. B., Indianapolis.
Stone, R. F., Indianapolis.
Walling, Willoughby, Chicago.
Waterman, L. D., Indianapolis.
Wishard, W. H., Indianapolis.

REMOVED.

Beck, H. A., Lebanon.
Little, C. S., Petersburg.
Orf, George, Unknown.

SUSPENDED.

Canfield, B. V.
McKee, J. F.
Westover, R. L.
Odell, T. A.
Pendleton, George.
Rowe, L. M.
Seiberth, Jacob.
Cain, Jas. D.
Amos, E. M.
DeVaney, M. O.

DECEASED.

McShane, John T., 229 N. Penn.
Link, W. H., 743 Virginia ave.

MARSHALL COUNTY.

OFFICERS.

J. W. Eidson, President.
H. P. Preston, Vice-Pres.
Novitas B. Aspinall, Secretary.
L. D. Ely, Treasurer.
Novitas B. Aspinall, Delegate.

CENSORS.

F. E. Radcliffe.
H. H. Tallman.
O. A. Rea.

MEMBERS.

Aspinall, Novitas B., Plymouth.
Borton, Artemas, Plymouth.
Eidson, J. W., Bourbon.
Eley, Lorenzo D., Plymouth.
Gould, S. W., Plymouth.
Holtzendorff, A. C., Plymouth.
Holtzendorff, C. F., Plymouth.
Johnson, Luther, Bourbon.
Knott, D. C., Plymouth.
Loring, S. C., Plymouth.
Nusbaum, C. E., Bremen.
Parker, E. E., Culver.

Preston, H. P., Plymouth.
Radcliffe, F. E., Bourbon.
Rea, O. A., Culver.
Ritchie, Samuel R., Donelson.
Stephens, R. C., Plymouth.
Tallman, H. H., LaPaz.
Thompson, A. A., Tyner.
Wahl, G. F., Bremen.
Wiseman, B. W. S., Culver

MARTIN COUNTY.

OFFICERS.

M. M. Dooley, President.
J. S. Gilkison, Vice-Pres.
T. A. Hays, Sec.-Treas.
H. W. Shirley, Delegate.

CENSORS.

I. N. Plummer.
J. N Sims.
G. M. Robinson.

MEMBERS.

Anderson, R., Loogootee.
Braxton, T. N., Loogootee.
Dollins, T. C., Trinity Springs.
Dooley, M. M., Loogootee.
Gilkison, J. S., Loogootee.
Gilkison, Wm. Loogootee.
Boner, G. W., Loogootee.
Hays, T. A., Burns City.
Plummer, I. N., Shoals.
Robinson, G. M., Loogootee.
Shirley, H. W., Shoals.
Sims, J. N., Shoals, R. R. No. 2.
Strange, J. H., Loogootee.
Trueblood, J. C., Loogootee.
Freeman, Geo., Shoals.
Stone, Chas. E., Shoals.

MIAMI COUNTY.

OFFICERS.

O. U. Carl, President.
J. B. Higgins, Vice-Pres.
D. C. Ridenour, Secretary.
J. O. Ward, Treasurer.
J. O. Ward, Delegate.

CENSORS.

J. C. Fretz.
O. W. Carl.
J. E. Yarling.

MEMBERS.

Andrews, E. H., Peru.
Bloomfield, E. M., Peru.
Carl, Omer U., Peru.
Clements, H. J., Converse.
Eikenberry, A. A., Peru.
Foust, P. G., Santa Fe.
Fretz, J. C., Deedsville.
Goodrick, C. E., Peru.
Helm, C. J., Peru.
Higgins, J. B., Peru.
Kimball, M. C., Converse.
Kalbfleisch, A. H., Peru.
Kratzer, E. F., Peru.
Peters, J. B., Macy.
Ridenour, D. C., Peru.
Spooner, Jared, Peru.
Wainscott, O. C., Peru.
Ward, J. O., Peru.
Yarling, J. E., Peru.
Griswold, E. H., Peru.

HONORARY.

Moore, John W., Mexico.
Passage, H. V., Peru.

SUSPENDED.

Smith, A. F., Waupekong.
Boggs, M. M., Macy.

DECEASED.

Watkins, F. A. (Honorary), Peru

MONROE COUNTY.

OFFICERS.

Fred H. Batman, President.
Frank Tourner, Vice-Pres.
C. A. Coleman, Sec.-Treas.
C. E. Harris, Delegate.

CENSORS.

J. E. Harris.
Otto F. Rogers.
W. N. Culmer.

MEMBERS.

Baker, J. V., Harrodsburg.
Stout, O. M., Harrodsburg.
Simmons, W. D., Clear Creek.
Luzzader, J. E., Smithville.
Kentling, Joseph, Smithville.
Morris, Oliver M., Stanford.
Harris, Walter W., Elletsville.
Harris, Oliver K., Elletsville.
Batman, Fred H., Bloomington.
Coleman, Augustus C., Bloomington.
Culmer, W. H., Bloomington.
Famulner, L. W., Bloomington.
Gardner, Fletcher, Bloomington.
Gardner, Lucy, Woodard, Bloomington.
Harris, John E., Bloomington.
Harris, Edward C., Bloomington.
Heskett, W. C., Bloomington.
Holland, J. E. P., Bloomington.
Holland, George F., Bloomington.
Holland, P. C., Bloomington.
Klein, W. W., Bloomington.
Manwaring, W. H., Bloomington.
Myers, B. D., Bloomington.
Pohlman, A. G., Bloomington.
Rogers, Robert C., Bloomington.
Rogers, Otto Floyd, Bloomington.
Ross, John C., Bloomington.
Schaffer, George C., Bloomington.
Tourner, John P., Bloomington.
Tourner, Frank F., Bloomington.
Vermyla, J. C., Bloomington.
Wilshire, J. W., Bloomington.
Whetsell, Leon E., Bloomington.
Smith, Thurston, Bloomington.
Lowder, L. T., Bloomington.

REMOVED.

Lowder, Lillian C., Bloomington.

MONTGOMERY COUNTY.

OFFICERS.

O. H. Jones, President.
C. H. Walden, Vice-Pres.
W. G. Swank, Sec.-Treas.

CENSORS.

E. W. Keegan,
Fred A. Dennis.
E. H. Cowan.

MEMBERS.

Barcus, Paul J., Crawfordsville.
Vancleave, W. E., New Market.
Davidson, J. F., Crawfordsville.
Girard, R. H., Crawfordsville.
Ensminger, S. L., Crawfordsville.
Elliott, J. W., Linden.
Sigmond, H. W., Crawfordsville.
Bounnell, H. M., Waynetown.
Ball, T. Z., Waveland.
Etter, J. R., Crawfordsville.
Cowan, E. H., Crawfordsville.
Beatty, J. L., Crawfordsville.
Griffith, T. J., Crawfordsville.
Griffith, Martha H., Crawfordsville.
Allhands, Frank D., Wingate.
Williams, George F., Crawfordsville.
Ristine, W. H., Crawfordsville.
Batman, W. F., Ladoga.
Walden, C. H., New Market.
Hamilton, A. N., Waynetown.
Hutchings, B. F., Crawfordsville.
Jones, O. H., Crawfordsville.
Swope, A. A., Crawfordsville.
Wolfe, J. P., New Market.
Price, E. O., Ladoga.
Peacock, S. R., Ladoga.

Griffith, J. B., Alamo.
Swank, W. G., Crawfordsville.
Burkel, J. C., New Ross.
Greene, H. E., Crawfordsville.
Keegan, E. W., Crawfordsville.
King, R. F., New Ross.
Shonkwiler, F. M., New Market.

SUSPENDED.

Brown, A. L., Alamo.
Clements, G. E., Crawfordsville.
Dennis, F. A., Crawfordsville.

REMOVED.

Hutchings, B. M., Crawfordsville.
West, B. F., Singapore.

MORGAN COUNTY.

Theodore Henson, President.
A. S. Tilford, Sec.-Treas.

MEMBERS.

Gravis, C. M., Martinsville.
Green, E. V., Martinsville.
Hendricks, W. E., Martinsville.
Henson, Theo., Martinsville.
Robinson, F. C., Martinsville.
Robinson, H. C., Martinsville.
Sandy, W. J., Martinsville.
Spoor, J. S., Brooklyn.
Tilford, A. S., Martinsville.
Breedlove, Geo. B., Brooklyn.
Kennedy, D. P., Martinsville.
Kennedy, John, Paragon.
Magenheimer, V. A., Waverly.
Maxwell, F. R., Martinsville.
Monical, G. S., Martinsville.
Seaton, Chas. Martinsville.
Sweet, E. M., Martinsville.
Sweet, O. A., Martinsville.

SUSPENDED.

Brackney, M. F., Mooresville.

REMOVED.

Brown, A. S., Paragon.

NOBLE COUNTY.

OFFICERS.

W. K. Mitchell, President.
W. A. Johnson, Vice-Pres.
W. F. Carver, Sec.-Treas.

CENSORS.

John W. Hays.
Geo. B. Lake.
S. L. Shaw.

MEMBERS.

Black, F. W., Ligonier.
Bowen, M. F., Kendallville.
Bowker, J. J., LaOtto.
Carver, W. F., Albion.
DePew E. W., Wolf Lake.
Franks, O. P., Brimfield.
Franks, W. H., Ligonier.
Gardiner, C. A., Kendallville.
Gilbert, J. L., Kendallville.
Goodwin, C. B., Kendallville.
Green, Thos. C., Albion.
Green, W. T., Albion.
Hays, J. W. Albion.
King, H. O., Kendallville.
Lake, G B., Wolcottville.
Lemmon, S. W., Albion.
Luckey, J. E., Wolf Lake.
Maloney, F. C., Avilla.
Miller, B. E., Albion.
Mitchell, W. K., Ligonier.
Moor, J. W., Albion.
Nye, J. H., Cromwell.
Seymoure, C. A., Wawaka.
Shaw, S. L., Kimmell.

Shobe, W. A., Ligonier.
Shook, N. J., Kendallville.
Teal, G. A., Kendallville.
Tucker, H. G., Cromwell.
Veazy, W. M., Avilla.
Williams, W. A., Kendallville.
Woodruff, C. A., Ligonier.

REMOVED.

Johnson, W. A., Bath.

ORANGE COUNTY.

OFFICERS.

S. F. Teaford, President.
W. W. Sloan, Vice-Pres.
J. R. Dillinger, Sec.-Treas.
S. F. Teaford, Delegate.

CENSORS.

J. A. Toliver.
J. I. Maris.
R. E. Baker.

MEMBERS.

Baker, Robert E., Orleans.
Boyd, Charles L., Paol .
Boyd, Clarence E., West Baden.
Dillinger, Joseph A., French Lick.
Dowden, Charles W., West Baden.
Hoggatt, Wm. W., French Lick.
Howard, J. L., West Baden.
Hassenmiller, Mort., West Baden.
Hunt, Franklin P., Leipsic.
Kahlo, Geo. D., French Lick.
Lindley, Laban, Paoli.
Lingle, S. L., Paoli.
Maris, J. Irvin, Paoli.
Patton, W. H., Orleans.
Ritter, T. B., Orleans.
Ritter, H. O., Orangeville.
Stewart, O. H., Orleans.
Sloan, W. W., French Lick.
Toliver, J. A., French Lick.
Teaford, S. F., Paoli.

OWEN COUNTY.

OFFICERS.

N. D. Cox, President.
R. C. Holtzman, Vice-Pres.
Allen Pierson, Sec.-Treas.
Jacob Coble, Delegate.

CENSORS.

R. R. Coble.
H. A. Fox.
J. N. Sloan.

MEMBERS.

Brown, A. S., Coal City.
Chenoweth, E. B., Quincy.
Coble, Jacob, Spencer.
Coble, R. R., Spencer.
Cox, N. D., Spencer.
Fox, H. A., Gosport.
Gantz, Thomas, Freedom.
Hazel, James T., Freedom.
Holtzman, R. E., Stinesville.
Jones, J. M., Cataract.
Kennedy, A. C., Patricksburg.
McDonald D. H., Quincy.
Osgood, H. G., Gosport.
Pierson, Allen, Spencer.
Richards, S. D., Patricksburg.
Richards, R. H., Patricksburg.
Sloam, J. N., Spencer.
Stucky, F. V., Gosport.
White, C. H., Cataract.
Wiles, F. M., Indianapolis.
Willoughby, G. E., Gosport.
Yocum, B., Coal City.

HONORARY.

Maddox, W. B. S., Vandalia.
Stucky, J. M., Gosport.

REMOVED.

Davis, W. M., Worthington.
Spears, A. H., Edwardsport.

PARKE COUNTY.

OFFICERS.

J. I. Norman, President.
A. Martin, Vice-Pres.
W. H. Gillum, Sec.-Treas.
F. S. Cuthbert, Delegate.

CENSORS.

The Society.

MEMBERS.

Cuthbert, F. S., Tangier.
Dutton, H. H., Judson.
Evans, E. A., Rosedale.
Gillum, W. H., Rockville.
Hester, R. F., Bloomingdale.
Martin, A., Bellmore.
Morris, C. C., Rockville.
Norman, J. I., Parkeville.
Peare, R. C., Bellmore.
Rogers, H. C., Rockville.
Shonkwiler, Joseph, Rockville.
Swope, R. E., Rockville.
Williamson, A. A., Marshall.
Maddox, O. E., Rockville.
White, C. S., Rosedale.
Lockridge, A. B., Montezuma.
Dooley, R. L., Montezuma.
Collings, T. Jesse, Mecca.
Caplinger, C. A., Wallace.
Overpeck, C. W., Catlin.
Woodard, M. F., Bloomingdale.
Towey, J. T., Jessup.
Davis, Wm. S., Marshall.
Goss, Marion, Rockville.

PERRY COUNTY.

OFFICERS.

M. W. Rothrock, President.
C. E. Cox, Vice-President.
Chas. M. Brucker, Sec.-Treas.
Chas. M. Brucker, Delegate.

CENSORS.

Wm. Cluthe.
Wm. H. Muelchi.
J. H. Schreifer.

MEMBERS.

Brucker, Chas. M., Tell City.
Cluthe, Wm., Tell City.
Cox, Chas. E., Cannelton.
Muelchi, Wm. H., Tell City.
Rothrock, M. W., Tell City.
Schriefer, J. H., Mosby.
Snyder, E. R., Troy.
Taylor, J. E., Leopold.

SUSPENDED.

Allenbaugh, E. E., Huft.

PIKE COUNTY.

OFFICERS.

Wm. Hunter, President.
W. J. Bethel, Vice-Pres.
E. S. Imel, Sec.-Treas.
O. A. Byers, Delegate.

CENSORS.

J. T. Kime.
T. W. Basinger.
J. W. Coleman.

MEMBERS.

Abbott, C., Otwell.
Baily, H. T., Hosmer.
Basinger, T. W., Petersburg.
Bethel, W. J., Winslow.
Byers, O. A., Petersburg.
Clark, S. R., Union.

Coleman, J. W., Petersburg.
Hunter, W. M., Petersburg.
Imel, S., Petersburg.
Ireland, G. L., Winslow.
Kime, J. T., Petersburg.
Logan, A. R., Algiers.
Rice, T. R., Petersburg.

PORTER COUNTY.

OFFICERS.

A. D. Dobbins, President.
A. P. Letherman, Vice-Pres.
P. R. Urmston, Sec.-Treas.
D. J. Loring, Delegate.

CENSORS.

A. D. Dobbins.
H. M. Evans.
J. C. Carson.

MEMBERS.

Ball, E. G., Valparaiso.
Blount, R. D., Valparaiso.
Carson, J. C., Valparaiso.
Dobbins, A. D., Wheeler.
Evans, H. M., Valparaiso.
Howerth, Cora, Valparaiso.
Letherman, A. P., Valparaiso.
Loring, D. J., Valparaiso.
Noland, P. D., Kouts.
Powell, E. H., Valparaiso.
Urmston, P. R., Valparaiso.
Wiltfong, C. O., Chesterton.
Young, S. J., Valparaiso.

POSEY COUNTY.

OFFICERS.

J. E. Gudgel, President.
R. L. Hardwick, Vice-Pres.
F. L. Stallings, Sec.-Treas.
C. L. Rawlings, Delegate.

CENSORS.

R. M. Stormont.
U. G. Whiting.
C. Hicks.

MEMBERS.

Auburn, Chas., Wadesville.
Barrett, C. P., Oliver.
Boren, S. W., Poseyville.
Cremeaus, W. C., Mt. Vernon.
Doerr, J. E., Mt. Vernon.
Emick, F. C., Mt. Vernon.
Fullenwider, C. H., Mt. Vernon.
Flucks, Carl, St. Wendell.
Grim, Simon, Caborns.
Gudgel, J. E., Cynthiana.
Hardwick, R. L., Mt. Vernon.
Heusler, E. H. C., Howell, R. R.
Holton, Wm., New Harmony.
Hicks, C., Mt. Vernon.
Hall, F. J., Caborns.
Henderson, Samuel, Howell, R. R.
Montgomery, S. B., Cynthiana.
Murphy, W. W., Stewartsville.
Petitjean, J. W., St. Wendell.
Runcie, G. W., Poseyville.
Ramsey, D. C., Mt. Vernon.
Rawlings, C. L., New Harmony.
Rawlings, S. O., New Harmony.
Stormont, R. M., Stewartsville.
Stallings, F. L., New Harmony.
Suggs, H. H., Mt. Vernon.
Smith, G. C., Poseyville.
Thompson, W. A., New Harmony.
Whiting, U. G., New Harmony.
Welch, D. W., Mt. Vernon.
Turman, I. L., Cynthiana.

REMOVED.

Cox, J. W., Howell.
Glaze, J. M., California.

SUSPENDED.

Wilson, T. W., New Harmony.

PULASKI COUNTY.

OFFICERS.

William Kelsey, President.
J. J. Thomas, Vice-Pres.
W. H. Thompson, Sec.-Treas.
G. W. Thompson, Delegate.

CENSORS.

H. C. Stevens.
T. W. Kelsey.
J. J. Jones.

MEMBERS.

Hackley, W., Medaryville.
Jones, J. J., Medaryville.
Kelsey, William, Monterey.
Kelsey, A. J., Monterey.
Kelsey, W. E., Monterey.
Kelsey, T. W., Francesville.
Stevens, H. C., Star City.
Thompson, W. H., Winamac.
Thompson, G. W., Winamac.
Thomas, J. J., Winamac.
Thomas, R. F., Winamac.
Washburn, G. W., Star City.

PUTNAM COUNTY.

OFFICERS.

Jerome M. King, President.
W. R. Hutcheson, Vice-Pres.
J. V. Bastin, Secretary.
L. M. Hanna, Treasurer.

CENSORS.

C. N. Stroube.
W. R. Hutcheson.
Chas. Sudranski.

MEMBERS.

Bastin, J. V., Greencastle.
Collins, C. C., Roachdale.
Evans, E. B., Greencastle.
Gillespie, J. F., Greencastle.
Hanna, L. M., Greencastle.
Hawkins, E., Greencastle.
Hope, C. F., Coatsville.
Horn, A. H., Putnamville.
Hutcheson, W. R., Greencastle.
Hurst, E. M., Cloverdale.
McGauhey, W., Greencastle.
Mercer, O. P., Reelsville.
Mullinix, P., Greencastle.
King, J. M., Greencastle.
New, Y. U., Barnard.
Preston, J. L., Greencastle.
Strobe, C. N., Roachdale.
Sudranski, C., Greencastle.
Tucker, W. W., Greencastle.
Zaring, Z. T., Greencastle.
Zaring, Everett, Reelsville.

SUSPENDED.

Cully, J. F., Bainbridge.

RANDOLPH COUNTY.

OFFICERS.

Edward G. Reynard, President.
Chas. E. Milligan, Vice-Pres.
Charles L. Botkin, Sec.-Treas.
B. S. Hunt, Delegate.

CENSORS.

J. H. Moroney.
B. S. Hunt.
Fred. McKay Ruby.

MEMBERS.

Blair, James S., Lynn.
Botkin, Chas. L., Farmland.
Chenoweth, Nelson T., Parker City.
Chenoweth, Forrest A., Winchester.
Cox, Cyrus R., Lynn.
Cromer, Mary O., Union City.
Cromer, Leonard G., Union City.
Current, Orpheus E., Farmland.
Davis, Lewis N., Farmland.
Evans, Caleb S., Union City.
Evans, Joseph J., Winchester.
Hunt, Bader S., Winchester.
Kirth, F. E., Modoc.
Markle, Grant C., Winchester.
Milligan, Chas. E., Winchester.
Moroney, James H., Winchester.
Nixon, John, Farmland.
Nixon, Jesse E., Ridgeville.
Reynard, Granville, Union City.
Reynard, Edward G., Union City.
Rine, Edward W., Winchester.
Root, William W., Parker City.
Rogers, Aaron G., Parker City.
Ruby, Fred McKay, Union City.
Ruby, Samuel B., Union City.
Shaddy, Elmer D., Saratoga.
Spitler, Chas. E., Saratoga.
Wiggins, Delana S., Losantville.

SUSPENDED.

Abel, Oscar E., Modoc, R. R.
Coffin, Alonzo H., Carlos City.

RIPLEY COUNTY.

OFFICERS.

Russell T. Olmsted, President.
John R. Pate, Vice-Pres.
John G. Jones, Sec.-Treas.
Florence Olmsted, Delegate.

CENSORS.

E. D. Freeman.
J. N. Hess.
F. M. Kremer.

MEMBERS.

Cox, Lafayette T., Napoleon.
Freeman, Edward D., Osgood.
Hess, John N., New Marion.
Holton, Chas. E., Holton.
Jones, John G., Versailles.
Kremer, Fred, St. Magdelene.
McClure, Sher. W., Elrod.
Olmsted, Russel T., Versailles.
Olmsted, Florence, North Vernon.
Pate, John R., Milan.
Townsend, R. C., Osgood.

SUSPENDED.

Cox, J. G., Holton.
Pinkston, J. N., Milan.

RUSH COUNTY.

OFFICERS.

J. F. Bowen, President.
T. H. Green, Vice-Pres.
W. S. Coleman, Sec.-Treas.
H. V. Logan, Delegate.

CENSORS.

J. T. Paxton.
D. D. Van Osdol.
S. C. Thomas.

MEMBERS.

Blount, R. T., Homer.
Bowen, J. F., Rushville, R. F. D.
Coleman, W. S., Rushville.
Elliott, H. H., Glenwood.
Green, T. H., Rushville.
Hougland, C. S., Milroy.
Hackleman, F. G., Rushville.
Logan, H. V., New Salem.

Paxton, J. T., Glenwood,
Rea, C. S., Falmouth.
Parsons, C. H., Rushville.
Sexton, J. C., Rushville.
Smith, I. F., Arlington.
Smith, W. C., Rushville.
Smith, W. H., Rushville.
VanOsdol, D. D., Rushville.
Wooden, E. I., Rushville.
Thomas, S. C., Milroy.

SUSPENDED.

Sipe, J. A., Carthage.
Cregor, F. W., Carthage.
Metcalf, H. P., Andersonville.

ST. JOSEPH COUNTY.

OFFICERS.

H. F. Mitchell, President.
E. R. Dean, Vice-Pres.
W. G. Wegner, Secretary.
C. M. Butterworth, Treasurer.
J. B. Berteling, Delegate.

CENSORS.

J. W. Hill.
C. C. Terry.
E. J. Lent.

MEMBERS.

Barber, A. E., South Bend.
Berteling, J. B., South Bend.
Brown, J. R., Sumption Prairie.
Butterworth, C. M., South Bend.
Borley, E. R., South Bend.
Boyd-Snee, H., South Bend.
Barandy, Oscar Von, South Bend.
Bosenbury, Chas. South Bend.
Cannon, J. H., South Bend.
Clark, S. A., South Bend.
Crumpacker, C. P., South Bend.
Dresch, C. A., Mishawaka.
Daugherty, C. A., South Bend.
Dean, E. R., South Bend.
Dugdale, R. B., South Bend.
Eastman, F. P., South Bend.
Epperson, Adah, South Bend.
Fink, H. A., South Bend.
Greene, J. B., Mishawaka.
Galloway, U. G., South Bend.
Hager, W. A., South Bend.
Hansel, C. A., South Bend.
Hill, J. W., South Bend.
Kaple, J. D., South Bend.
Lent, E. J., South Bend.
Miranda, W. F., Walkerton.
Mitchell, H. F., South Bend.
Moore, E. J., South Bend.
Montgomery, H. T., South Bend.
McNamara, D. W., South Bend.
Miller, H. M., South Bend.
Mills, W. F., South Bend.
Olney, T. A., South Bend.
Proudfit, Louis, Osceola.
Peck, Walter M., South Bend.
Rennoe, C. A., South Bend.
Sawyer, F. M., South Bend.
Stoltz, Chas., South Bend.
Seaman, J. B., Osceola.
Stroupe, C. C., Mishawaka.
Terry, C. C., South Bend.
Taylor, Chas. H., South Bend.
Urquhart, R. T., South Bend.
Van Pelt, R. T., South Bend.
Varier, J. A., South Bend.
Wickham, W. A. R., South Bend.
Wegner, W G., South Bend.
Wood, W. F., Mishawaka.
Tullar, A. G., New Carlisle.
Owen, W. Q., South Bend.
Shanklin, R. A., South Bend.
Sensenick, R. L., South Bend.
Murray, Helen, South Bend.
Martin, E. A., South Bend.
Owen, Mary, South Bend.
Denant, M. S., Walkerton.

SUSPENDED.

Borley, W. E., Mishawaka.
Gilbrech, A. H., Lakeville.
Lockwood, S. W., South Bend.
Rieman, W. H., South Bend.

SCOTT COUNTY.

OFFICERS.

Thomas H. Close, President.
W. L. McClain, Vice-Pres.
T. E. Biery, Sec.-Treas.
O. C. Murphy, Delegate.

CENSORS.

A. J. Sarver.
O. C. Murphy.
Geo. F. Cline.

MEMBERS.

Biery, T. E., Scottsburg.
Cline, G. F., Scottsburg.
Close, Thos. H., Scottsburg.
Hawn, C. E., Little York.
Kendall, C. A., Austin.
Lothrop, A. H., Lexington.
McClain, W. L., Scottsburg.
McClain, Levi, Scottsburg.
Murphy, O. C., Scottsburg.
Wilson, J. P., Scottsburg.
Sarver, J. A., Scottsburg.

SHELBY COUNTY.

OFFICERS.

S. L. Strickler, President.
G. I. Inlow, Vice-Pres.
W. C. McFadden, Sec.-Treas.
W. C. McFadden, Delegate.

CENSORS.

Frank Campbell.
Morris Drake.
Frank Ray.

MEMBERS.

Boone, B. H., Boggstown.
Campbell, Frank, Shelbyville.
Carter, Laura, Shelbyville.
Connelly, H. M., Shelbyville.
Drake, Morris, Shelbyville.
Green, T. G., Shelbyville.
Inlow, G. L., Blue Ridge.
Inlow, I. W., Blue Ridge.
Keeling, J. E., Waldron.
Keeney, B. G., Shelbyville.
Kennedy, Samuel, Shelbvyille.
Kennedy, T. C., Shelbyville.
Kennedy, W. H., Shelbyville.
McFadden, Walter C., Shelbyville.
Parish, J. W., Shelbyville.
Patten, V. C., Morristown.
Perry, Chas., Lewis Creek.
Pettigrew, D. A., Flat Rock.
Phares, H. E., Shelbyville.
Randolph, D. F., Waldron.
Ray, Frank E., Shelbyville.
Rubush, T. R., London.
Snider, J. W., Fairland.
Strickler, S. L., Boggstown.

SUSPENDED.

Bass, Frank, Morristown.

DECEASED.

Bowlby, Jos., Shelbyville.

SPENCER COUNTY.

OFFICERS.

H. G. Weiss, President.
S. L. Carson, Vice-Pres.
Eva Buxton, Sec.-Treas.

CENSORS.

O. C. Baumgaertner.
Eva Buxton.
C. H. Adye.

MEMBERS.

Adye, C. H., Patronville.
Baumgaertner, O. C., Rockport.
Buxton, Eva, Rockport.
Carson, S. L., Lincoln City.
Cramm, Geo. W., Fulda.
Daily, J. M., Rockport.
Gwaltney, S. P., Christney.
Harter, Harry, Newtonville.
James, N. A., St. Meinrad.
Stuteville, S. W., Grandview.
Tulley, Lee H., Lamar, R. R. 2.
Weiss, H. G., Rockport.
White, H. I., Grandview.

REMOVED.

Wetzel, George, Rockport.

SUSPENDED.

Schweitzer, John J., Santa Claus.

STEUBEN COUNTY.

OFFICERS.

Thomas B. Williams, President.
Thomas J. Creel, Vice-Pres.
Mary T. Ritter, Sec.-Treas.
Otto H. Swantusch, Delegate.

CENSORS.

P. N. Sutherland.
F. B. Humphreys.
T. J. Creel.

MEMBERS.

Cameron, J. F., Hamilton.
Creel, T. J., Angola.
Humphreys, T. B., Angola.
Kimmel, A. J., Hudson.
Lane, W. H., Angola.
Ritter, Mary T., Angola.
Sutherland, P. N., Angola.
Swantusch, O. H., Metz.
Waller, Wm. H., Angola.
Williams, T. B., Angola.
Wood, H. D., Angola.
Wood, T. F., Angola.
Wood, W. W., Angola.

DECEASED.

Wilkinson, J. J., Orland.

SULLIVAN COUNTY.

OFFICERS.

J. B. Maple, President.
J. E. McConnel, Vice-Pres.
E. M. Corbin, Sec.-Treas.

CENSORS.

W. N. Thompson.
J. L. Durham.
E. D. Thixton.

MEMBERS.

Allsman, S. J., Pleasantville.
Amerman, C. E., Linton.
Bedwell, T. S., Dugger.
Bland, H. C., Fairbanks.
Briggs, C. F., Sullivan.
Coulson, S. B., Jackson Hill.
Crowder, J. R., Sullivan.
Corbin, E. M., Sullivan.
Durham, J. L., Graysville.
Deputy, E. M., Dugger.
Edwards, C. H., Sullivan.
Freeman, Joseph, Sullivan.
Maple, J. B., Shelburn.
McConnel, J. E., Carlisle.
Oliphant, J. T., Farmersburg.
Robbins, F. L., Carlisle.
Thixton, E. D., Sullivan.
Thralls, R. T., Hymera.

Thralls, C. U., Hymera.
Thompson, W. N., Sullivan.
Shanklin, L. B., Sullivan.
Vancleave, R. H., Farmersburg.
Wrork, J. H., Shelburn.
Pirtle, G. W., Carlisle.
Goshorn, Leonard, Hymera.
Neff, J. H., Fairbanks.
Miles, James, Merom.
Cushman, A., Graysville.

REMOVED.

Faith, A. H., Sullivan.
Yager, E. J., Graysville.

SUSPENDED.

Bland, H. E., Fairbanks.
Crowder, R. H., Sullivan.
Parker, J. J., Merom.
Walters, C. R., Paxton.

SWITZERLAND COUNTY.

OFFICERS.

John W. Smith, President.
Hugh M. Thiebaud, Vice-Pres.
Chas. Loomis, Sec.-Treas.
L. H. Bear, Delegate.

CENSORS.

Scott Culbertson.
H. M. Thiebaud.
Chas. Loomis.

MEMBERS.

Bear, L. H., Vevay.
Copeland, Robert M., Bennington.
Culbertson, Scott, Vevay.
Douglas, Delver E., E. Enterprise.
Loomis, Charles, Vevay.
Shaddy, John H., Vevay.
Smith, John W., Vevay.
Thiebaud, Hugh M., Vevay.
Ward, John P., Vevay.
Copeland, Geo., Moorefield.

SUSPENDED.

Hayden, D. N., Vevay.
Woollen, L. J., Vevay.

TIPPECANOE COUNTY.

OFFICERS.

Chas. B. Kern, President.
Frank M. Biddle, Vice-Pres.
Wm. M. Reser, Secretary.
Chas. Hupe, Treasurer.
Geo. F. Keiper, Delegate.

CENSORS.

F. B. Thompson.
Geo. F. Beasley.
W. R. Moffitt.

MEMBERS.

Baker, Erasmus, West Point.
Baker, Ernest S., Lafayette.
Beasley, Geo. F., Lafayette.
Biddle, Frank M., Battle Ground.
Bitting, A. W., West Lafayette.
Butler, W. F., Stockwell.
Campbell, Robt. M., West Point.
Campbell, Wm. S., Lafayette.
Davidson, Edward C., Lafayette.
Driscoll, C. C., Lafayette.
Hannell, Roy V., Lafayette.
Hillis, Jas. D., Lafayette.
Hopper, Milton S., Lafayette.
Hupe, Chas., Lafayette.
Keiper, Geo. P., Lafayette.
Kern, Chas. B., Lafayette.
Lairy, Mansom M., Lafayette.
Levering, Guy P., Lafayette.
McMahan, Adab, Lafayette.
Mitchell, Josephine M., Lafayette.

Moffit, Wm. R., West Lafayette.
Morrison, John S., Lafayette.
Nesbitt, Wm. S., Dayton.
Peters, W. H., Lafayette.
Reser, Wm. M., Lafayette.
Revis, Geo. Lafayette.
Schreiber, Adam W., Lafayette.
Shafer, J. W., Lafayette.
Tea, Roger S., Lafayette.
Thompson, Frank B., Lafayette.
Throckmorton, George K., Lafayette.
Tilson, Washburn, Lafayette.
Walker, Wm. S., Lafayette.
Washburn, S. S., Lafayette.
Webster, John C., Lafayette.
Westfall, Arthur B., Lafayette.
Wetherill, Richard B., Lafayette.
Wilson, Milton C., Lafayette.

HONORARY.

Burrage, Prof. S., W. Lafayette.
Coulter, Prof. S., Lafayette.

TIPTON COUNTY.

OFFICERS.

W. E. McKee, President.
H. E. Grishaw, Vice-Pres.
A. W. Gifford, Sec.-Treas.
A. S. Dickey, Delegate.

CENSORS.

T. W. Longfellow.
E. I. Hinkle.
H. G. Read.

MEMBERS

Dickey, A. S., Tipton.
Grishaw, A. E., Tipton.
Gifford, A. W., Tipton.
Hinkle, E. J., Goldsmith.
Hutto, H. W., Sharpsville.
Longfellow, E. W., Windfall.
McKee, W. E., Tipton.
Newcomer, M. V. B., Tipton.
Ploughe, M. T., Kempton.
Read, H. G., Tipton.
Cotton, S. M., Goldsmith.

UNION COUNTY.

OFFICERS.

M. F. Veraker, President.
Garrett Pigman, Vice-Pres.
E. R. Beard, Sec.-Treas.
F. T. DuBois, Delegate.

CENSORS.

M. F. Veraker.
Garrett Pigman.
E. R. Beard.

MEMBERS.

Beard, E. R., Liberty.
DuBois, Franklin T., Liberty.
Egolf, H. M., Liberty.
Hawley, W. H., College Corner, O.
Kell, S. D., Liberty.
Morris, J. E., Liberty.
Pigman, Garrett, Liberty.
Veraker, M. F., Kitchel.

VANDERBURGH COUNTY.

OFFICERS.

M. Ravdin, President.
B. J. Knapp, Vice-Pres.
W. R. Davidson, Sec.-Treas.
Edwin Walker, Delegate.

CENSORS.

Edwin Walker.
G. W. Varner.
B. W. L. Floyd

MEMBERS.

Bacon, C. P., Evansville.
Baughman, J. N., Evansville.
Begley, B. W., Inglefield.
Berger, E. V., Howell.
Binkley, J. F., Evansville.
Bitz, L. B., Evansville.
Boyden, C. F., Evansville.
Brose, L. D., Evansville.
Bruning, Louise, Evansville.
Bryan, T. L., Evansville.
Busse, E. P., Evansville.
Cain, D. B., Evansville.
Cleveland, W. F., Evansville.
Cleveland, W. R., Evansville.
Coleman, W. H., Evansville.
Conover, Earl, Evansville.
Cottingham, J. E., Evansville.
Cramm, E. J., Evansville.
Cox, D. A., Howell.
Davidson, W. R., Evansville.
Davis, F. L., Evansville.
Dixon, H. F., Evansville.
Duddenhausen, W. C., Evansville.
Eichel, S. J., Evansville.
Faith, N. H., Evansville.
Field, W. H., Evansville.
Floyd, B. W. L., Evansville.
Frick, H. C., Evansville.
Fritsch, L. J., Evansville.
Fritsch, W. A., Evansville.
Gilbert, W. H., Evansville.
Glover, J. F., Evansville.
Gottman, H. N., Evansville.
Greenleaf, G. F., Evansville.
Harpole, C. B., Evansville.
Hartloff, C. W., Evansville.
Hayden, A. M., Evansville.
Heberer, J. M., Evansville.
Herbert, S. Z., Evansville.
Heimann, L., Evansville.
Hodson, G. P., Evansville.
Huber, J. G , Evansville.
Hudson, M. D., Evansville.
Ingle, C. V., Evansville.
Jerome, J. N., Evansville.
Jones, Geo. E., Evansville.
Kelsay, C., Evansville.
Kerth, J. H., Evansville.
Knapp, A. J., Evansville.
Knapp, B. J., Evansville.
Knapp, Chas., Evansville.
Laubscher, S. J., Evansville, R. F. D.
Laughlin, C. E., Evansville.
Laval, W. J., Evansville.
Laval, E. J., Evansville.
Linthicum, E., Evansville.
Lorenz, J. W., Evansville.
McClurkin, J. C., Evansville.
McCool, H. F., Evansville.
McCool, W. E., Evansville.
McCoy, P. Y., Evansville.
McCutchan, J. H., Evansville.
Macer, E. C., Evansville.
Macer, Thos., Evansville.
Nenneker, H. E., Evansville.
Phares, J. W., Evansville.
Pollard, W. S., Evansville.
Pritchett, W. S., Evansville.
Ravdin, M., Evansville.
Reavis, W. J., Evansville.
Rietz, P. C., Evansville.
Rose, B. S., Evansville.
Sessions, S. K., Evansville.
Stark, J. W., Evansville, R. F. D.
Taylor, T. H., Evansville.
Tepe, G. W., Evansville.
Thomas, James, Evansville.
Tweedall, D. G., Evansville.
Varner, G. W., Evansville.
Varner, W. T., Evansville.
Verwayne, E. J., Evansville.
Viehe, C. G., Evansville.
Viehe, C. H., Evansville.
Walker, Edwin, Evansville.
Warter, Phillip, Evansville.
Weber, J. B., Evansville.
Welborn, J. Y., Evansville.
Willis, J. H., Evansville.
Wilton, I., Evansville.
Woods, W. P., Evansville.
Worsham, L., Evansville.
Young, G. M., Evansville.

REMOVED.

Witting, A. P., Evansville.

HONORARY.

Muhlhausen, M., Evansville.

Ralston, W. R., Evansville.
Schyler, P. L , Evansville.
Bryan, A. H., Evansville.

VERMILLION COUNTY.

OFFICERS.

M. L. Hall, President.
W. P. Darroch, Vice-Pres.
O. M. Keyes, Sec.-Treas.
Paul H. Keyes, Delegate.

CENSORS.

S. C. Darroch.
I. M. Casebeer.
P. H. Keyes.

MEMBERS.

Hall, M. L., Newport.
Casebeer, I. M., Newport.
Wallace, James, Newport.
Darroch, W. P., Cayuga.
Darroch, S. C., Cayuga.
Newhouse, O. A., Hillsdale.
Newton, J. T., St. Bernice.
Tucker, G. W., Dana.
Keyes, O. M., Dana.
Keyes, Paul H., Dana.

VIGO COUNTY.

OFFICERS.

L. P. Luckett, President.
B. V. Caffee, Vice-Pres.
Charles N. Combs, Sec.-Treas.
J. Rudolph Yung, Delegate.

CENSORS.

E. W. Layman.
J. L. Fortune.
Millard Knowlton.

MEMBERS.

Ashley, C. W., Clinton.
Bett, W. E., Terre Haute.
Belt, Richard, West Terre Haute.
Bernheimer, H. L., Terre Haute.
Bohn, J. C., Terre Haute.
Boor, M. A., Terre Haute.
Breaks, L. Z., Terre Haute.
Brown, T. F., Sandford.
Brunker, Jas. W., Riley.
Cabell, A. L., Terre Haute.
Caffee, A. H., Terre Haute.
Caffee, B. V., Terre Haute.
Carmichael, C. S., Seeleyville.
Combs, Charles N., Terre Haute.
Combs, M. R., Terre Haute.
Cook, J. H., Terre Haute.
Cooper, J. A., Terre Haute.
Crapo, G. W., Terre Haute.
Donnelly, J. E., Terre Haute.
Drake, Jas. F., Youngstown,
DuPuy, C. M., Riley.
Elliott, James, Terre Haute.
English, J. P., Terre Haute.
Fink, O. E., Terre Haute.
Fortune, J. L., Terre Haute.
Frisz, Jos. Terre Haute..
Gerrish, W. D., Clinton.
Gillum, J. R., Terre Haute.
Givens, C. C., Lewis.
Hawkins, Madge P., Terre Haute.
Hebble, D. W., Ellswortu.
Hemphill, F. H., Seelyville.
Hunt, J. S., West Terre Haute.
Hutchings, B. M., Terre Haute.
Jenkins, W. O., Terre Haute.
Jett, F. H., Terre Haute.
Knowlton, Millard, Terre Haute.
LaBier, C. R., Terre Haute.
Larkins, E. L., Terre Haute.
Laughead, J. T., Terre Haute.

Layman, E. W., Terre Haute
Leavitt, R. H., Terre Haute.
Luckett, L. P., Terre Haute.
McAllister, E. B., Terre Haute.
McCall, James, Terre Haute.
McClain, Leslie, Terre Haute.
McJohnston, W. E., Terre Haute.
Mapes, W. L., West Terre Haute.
Mattox, E. L., West Terre Haute.
Mattox, W. R., Terre Haute.
Moorhead, T. W., Terre Haute.
Mullikin, H. M., Terre Haute.
Newton, G. O., Dana.
Niblack, E. S., Terre Haute.
Nichols, John, Atherton.
Nichols, W. E., Terre Haute.
Patton, Chas., Terre Haute.
Ragan, C. E., Clinton.
Ray, C. C., Sandford.
Rice, S. M., Terre Haute.
Schell, Walker, Terre Haute.
Shaley, F. W., Terre Haute.
Sibley, L. H., Asientos, Mexico.
Smick, C. M., Terre Haute.
Spigler, O. R., Terre Haute.
Stunkard, T. C., Terre Haute.
Tabor, F. A., Terre Haute.
Ulmer, D. R., Terre Haute.
VanCleave, M. B., Terre Haute.
Weinstein, J. H., Terre Haute.
Weinstein, L. J., Terre Haute.
Weir, S. D., Terre Haute.
Wiedemann, F. E., Terre Haute.
Willien, L. J., Terre Haute.
Willien, W. F., Terre Haute.
Worrell, J. P., Terre Haute.
Wyeth, Chas. Terre Haute.
Young, S. T., Terre Haute.
Yung, J. Rudolph, Terre Haute.

REMOVED.

Scott, J. B., Europe.

WABASH COUNTY.

OFFICERS.

Frank S. Kitson, President.
Perry G. Moore, Vice-Pres.
Lawrence E. Jewett, Sec.-Treas.
Thompson R. Brady, Delegate.

CENSORS.

L. W. Smith.
P. G. Moore.
W. A. Domer.

MEMBERS.

Ader, Henry, Somerset.
Andrews, Miss Leila, N. Manchester.
Blount, R. F., Wabash.
Brady, T. R., Wabash.
Bloomer, F. H., Lagro.
Brodbeck, Geo. H., Roann.
Burke, Geo., Wabash.
Beaman, Z. M., Urbana.
Domer, W. A., Wabash.
Dicken, C. L., Lafontaine.
Fleming, C. F., Wabash.
Giffen, R. I., Lagro.
Houser, B. A., Wabash.
Hale, M. M., Wabash.
Hale, N. T., Wabash.
Hardman, W. E., North Manchester.
Jewett, L. E., Wabash.
Jordan, L. W., Wabash.
Kern, Aaron, Wabash.
King, C. H., Wabash.
Kitson, F. S., North Manchester.
Lower, M. O., North Manchester.
LaSelle, G. M., Wabash.
Minnich, W. T., Somerset.
Moore, P. G., Wabash.
Renner, M. E., Urbana.
Smith, Mrs. L. F. J., Wabash.
Smith, Lorin W., Wabash.
Stoler, A. E., Wabash.
Thompson, N. H., Wabash.
Wilson, James, Wabash,

SUSPENDED.

Rodgers, A. E., Somerset.

DECEASED.

Modricker, J. M., Wabash.
Shellhamer, D. C., Wabash.

WARRICK COUNTY.

OFFICERS.

J. G. Hoover, President.
Thos. Wright, Vice-Pres.
Dalton Wilson, Sec.-Treas.
W. A. Hewins, Delegate.

CENSORS.

W. H. Mills.
N. M. Spradley.
E. L. Youngblood.

MEMBERS.

Daily, W. W., Stanley.
DeForest, D. A., Boonville.
DeForest, D. F., Boonville.
Folsom, E. M., Boonville.
Ford, W. P., Boonville.
Hewins, W. A., Chandler.
Hoover, J. S., Boonville.
Hoover, P. N., Boonville.
Hunt, W. A., Lynnville.
Kister, George, Elberfield.
Lett, O. A., Newburg.
Mills, W. H., Boonville.
Schuck, J. H., Chandler.
Spradley, N. M., Tennyson.
Springston, C. E., Selvin.
Taylor, U. T., Newburg.
Tyner, S. L., Boonville.
West, E. A., Folsomville.
Wilson, Dalton, Yankeetown.
Wilson, W., Yankeetown.
Wright, Thos., Boonville.
Youngblood, E. L., Boonville.

SUSPENDED

Keegan, E. J., Chandler.
Taylor, E. C., Chandler.

WASHINGTON COUNTY.

OFFICERS.

W. J. Purkhiser, President.
H. C. Hobbs, Vice-Pres.
W. C. Cauble, Sec.-Treas.
Wm. R. Boggs, Delegate.

CENSORS.

R. J. Wilson.
A. A. Reed.

MEMBERS.

Boggs, William R., Salem.
Cauble, William C., Salem.
Hobbs, Havilla, C. Salem.
Mitchell, John I., Salem.
Reed, Andrew A., Salem.
Purkhiser, W. J., Salem.
Wilson, Richard J., Salem.

SUSPENDED.

Greene, W. L., Pekin
Spurgeon, C., Salem.

WAYNE COUNTY.

OFFICERS.

T. H. Davis, President.
C. P. Colburn, Vice-Pres.
D. W. Stevenson, Sec.-Treas.
J. E. King, Delegate.

CENSORS.

M. F. Johnston
Minnie Hervey.
H. B. Boyd.

MEMBERS.

Allen, S. O., Centerville.
Allen, J. B., Cambridge City.
Bond, C. S., Richmond.
Bond, E. S., Richmond.
Bowers, L. G., Richmond.
Boyd, H. B., Cambridge City.
Bradley, J. T., Abington.
Bramkamp, A. L., Richmond.
Buche, F. P., Richmond.
Bulla, J. M., Richmond.
Clark, J. B., Economy.
Colburn, C. P., Richmond.
Davis, T. H., Richmond.
Dunham, F. H., Richmond.
Ewing, U. B. G., Richmond.
Fouts, J. M., Centerville.
Gabel, H., Centerville.
Gentle, L. M., Milford.
Grant, G. H., Richmond.
Griffis, W. T., Fountain City.
Haughton, R. E., Richmond.
Helm, W. M., Williamsburg.
Hervey, Minnie E., Richmond.
Hopkins, R. R., Richmond.
Huff, O. N., Fountain City.
Huffman, W. G., Richmond.
Jenkins, Jennie, Richmond.
Johnson, P. S., Richmond.
Johnstone, M. F., Richmond.
Kienzle, F. W., Green's Fork.
King, J. E., Richmond.
Krueger, F. W., Richmond.
Littell, W. R., Cambridge City.
Loop, A. L., Economy.
McKee, C. E., Dublin.
Markley, S. C., Richmond.
Marvel, Charles, Richmond.
Mauk, J. R., Cambridge City.
Meek, J. B., Richmond.
Morrow, J. S., Richmond.
Pierce, R. J., Richmond.
Roark, C. A., Milton.
Schillinger, R., Richmond.
Smith, S. E., Richmond.
Stevenson, D. M., Richmond.
Stotelmyer, C. I., Hagerstown.
Study, J. N., Cambridge City.
Sweeney, I. F., Milton.
Wampler, I. M., Richmond.
Weist, H. H., Richmond.
Weller, J. E., Richmond.
Wright, J. E., Cambridge City.
Yencer, M. W., Boston.
Young, F., Richmond.
Burcham, E. H., Richmond.

SUSPENDED.

Walton, G. F., Dublin.
Meek, M. L., Abington.

REMOVED.

Bulla, M. S., Richmond.

WELLS COUNTY.

OFFICERS.

L. W. Smith, President.
G. B. Morris, Vice-Pres.
A. W. Brown, Secretary.
L. Mason, Treasurer.
L. W. Smith, Delegate.

CENSORS.

J. L. Redding.

MEMBERS.

Botts, E. H., Zanesville.
Blue, C. L., Fresin.
Cook, L. H., Bluffton.
Fulton, J. C., Bluffton.
Fulton, G. E., Bluffton.
Garrett, F. W., Liberty Center.
Gordon, S. A., Bluffton.
Hatfield, I. N., Bluffton.
Mason, L., Bluffton.
Metts, J. I., Ossian.

Metts, A. H., Ossian.
Metts, F., Ossian.
McKinney, J. W., Bluffton.
Morris, T., Mt. Zion.
Markley, H. W., Petroleum.
Newman, M. N., Ossian.
Spaulding, L. A., Bluffton.
Shoemaker, S. A., Poneto.
Severin, L., Bluffton.
Smith, L. W., Liberty Center.
Redding, J. L., Bluffton, R. R., 3.
Morris, G. B., Poneto.
Brown, A. W., Bluffton.
Dyer, E. W., Ossian.

SUSPENDED.

Dosted, H., Poneto.
Cheney, V. S., Bluffton.

WHITE COUNTY.

OFFICERS.

M. T. Didlake, President.
Fremont Cronk, Vice-Pres.
Grant Goodwin, Secretary.
R. J. Clark, Treasurer.
Geo. R. Clayton, Delegate.

CENSORS.

H. R. Minnick.
W. A. Spencer.
J. P. Galbreth.

MEMBERS.

Medaris, John W., Brookston.
Didlake, M. T., Monticello.
Clark, R. J., Monticello.
Clayton, Geo. R., Monon.
Cray, A. B., Monticello.
Cronk, Fremont, Wolcott.
Galbreth, J. P., Burnett's Creek.
McBeth, Walter, Burnett's Creek.
Minnick, Horace R., Idaville.
Reagon, R. M., Monon.
Goodwin, Grant, Monticello.
Spencer, W. A., Wolcott.

SUSPENDED.

Washburn, P. E., Buffalo.

DECEASED.

Carr, Jas. L., Monon.

WHITLEY COUNTY.

OFFICERS.

F. G. Grisier, President.
F. M. Magers, Vice-Pres.
W. F. King, Sec.-Treas.
W. F. King, Delegate.

CENSORS.

F. G. Grisier.
F. M. Magers.
W. F. King.

MEMBERS.

Eberhard, Eli L., South Whitley.
Grisier, F. G., Columbia City.
Hart, Bruce D., Churubusco.
King, W. F., Columbia City.
Linvill, D. S., Columbia City.
Magers, F. M., Churubusco.
Schuman, O. V., Columbia City.
Souder, C. L., Columbia City.
Tennant, L. W., Larwill.
Scott, J. W. C., Etna.
Williams, Alice B., Columbia City.

SUSPENDED.

Kithkart, N. I., Columbia City.

DECEASED.

Beach, Chas. E., Coesse.
Linvill, David G., Columbia City.

ALPHABETICAL LIST OF MEMBERS.

[Names of former members deceased, withdrawn, removed, suspended or expelled, are omitted from the list. The Secretary will correct errors upon notification in the next issue.]

Abbott, Clarence, Otwell.
Abel, Virgil, Vallonia.
Adams, C. J., Kokomo.
Adams, F. P., Elkhart.
Adams, Horace E., Harlan.
Adams, S. D., Brewersville.
Adams, Thos. J., North Salem.
Ader, Henry, Somerset.
Adye, C. H., Patronville.
Ainsley, Robert, Indiana Harbor.
Alexander, E. S., Indianapolis.
Alexander, H. H., Princeton.
Alexander, J. C., Indianapolis.
Alexander, J. H., Greensburg.
Alexander, L. E., Pendleton.
Alexander, W. P., Camden.
Allen, Horace R., Indianapolis.
Allen, I. O., Centerville.
Allen, J., Charlottesville.
Allen, J. B., Cambridge City.
Allen, Wesley, West Newton.
Allhands, F. D., Wingate.
Allred, G. G., Danville.
Allsman, S. J., Pleasantville.
Ambrose, U. C., Lyons Station.
Amiss, J. M., Silver Lake.
Ammerman, C. E., Linton.
Amy, W. E., Bicknell.
Anderson, D. A., Indianapolis.
Anderson, John B., Vincennes.
Anderson, J. W., Odon.
Anderson, R., Loogootee.
Anderson, R. S., Princeton.
Andrews, E. H., Peru.
Andrews, George R., Muncie.
Andrews, J. R., River Vale.
Andrews, Lelia N., Manchester.
Anglin, George W., Warsaw.
Annis, E. L., Laporte.
Armbruster, B. F., Columbus.
Armfield, J. D., Elwood.
Armfield, T. O., Elwood.
Armington, John, Anderson.
Arthur, H. M., Princeton.
Arthur, M. L., Washington, R. F. D.
Ash, E. E., Goshen.
Ashley, C. W., Clinton.
Aspinwall, N B., Plymouth.
Aspey, H. M., Geneva.
Atkinson, J. M., Eaton.
Auburn, Charles, Wadesville.
Austin, Fred H., North Madison.
Austin, M. A., Anderson.
Austin, Wisner, Summitville.
Axline, J. A., Noblesville.
Ayers, A. S., Indianapolis.

Bacon, C. F., Evansville.
Bacon, V. V., Michigan City.
Baer, S. W., Nappanee.
Bahr, Max A., Indianapolis.
Bailey, H. T., Glezen.
Baker, Erasmus S., West Point.
Baker, Ernest S., Lafayette.
Baker, J. V., Harrodsburg.
Baker, R. E., Orleans.
Baldwin, S. J., Hortonville.
Ball, E. J., Valparaiso.
Ball, Clay A., Muncie.
Ball, J. R., Lebanon.

Ball. L. L,, Muncie.
Ball, T. Z., Waveland.
Banker, A. J., Columbus.
Banker, W. H., Columbus.
Barber, A. E., South Bend.
Barcus, P. J., Crawfordsville.
Barandy, Oscar Von, South Bend.
Bare, A. W., Bryantsville.
Barker, Joel T., Danville.
Barker, Thomas R., Danville.
Barnard, P. C., Oakville.
Barnes, Arthur L., Southport.
Barnes, C. A., Greenfield.
Barnes, G. O., Seymour.
Barnett, Charles E., Ft. Wayne.
Barnett, W. W., Ft. Wayne.
Barnfield, J. H., Logansport.
Barnhill, Jno. F., Indianapolis.
Barrett, C. P., Oliver.
Bartholomew, A. C., Logansport.
Bartlett, C. G., Lewisville.
Bash, J. M., Warsaw.
Basinger, T. W., Petersburg.
Bastin, J. V., Greencastle.
Bates, J. M., Broad Ripple.
Batman, F. H., Bloomington.
Batman, W. F., Ladoga.
Baughman, J. N., Evansville.
Bauman, N. C., Goshen.
Baumgartner, O. C., Rockport.
Baxter, J. C., Auburn.
Baxter, J. W., Lanesville.
Beall, Charles G., Ft. Wayne.
Beach, C. E. C., Coesse.
Beaman, Z. M., Urbana.
Bear, L. H., Vevay.
Beard, E. R., Liberty.
Beard, Schuyler C., Vincennes.
Beasley, George F., Lafayette.
Beaty, W. H., Worthington.
Beatty, J. L., Crawfordsville.
Beavers, Seth D., Decatur.
Beck, H. A., Lebanon.
Beck, William S., Indianapolis.
Beckes, Norman E., Vincennes.
Beckett, C., Attica.
Beckman, H. S., Indianapolis.
Becknell, I. J., Goshen.
Bectol, C. O., Marion.
Bedwell, T. S., Dugger.
Begley, B. W., Evansville.
Bell, E. Edwin, Ft. Wayne.
Bell, Guido, Indianapolis.
Bell, J. N., New Burlington.
Bell, W. E., Terre Haute.
Bell, O. S., Hartford City.
Belt, Richard, West Terre Haute.
Benedict, H., Springport.
Benham, Chas. W., Vincennes.
Benham, F. A., Elkhart.
Benham, J. W., Columbus.
Bentle, P. C., Greensburg.
Berauer, J. M., Indianapolis.
Berger, E. V., Howell.
Bernheimer, H. L., Terre Haute.
Berner, Louis E., Indianapolis.
Berteling, J. B., South Bend.
Berry, D. F., Indianapolis.
Bethel, W. J., Winslow.
Bevier, Frank, Waterloo.
Biddle, F. M., Battle Ground.
Biery, T. E., Scottsburg.
Bills, Leroy, Atlanta.
Binkley, J. F., Evansville.
Bird, Chas. R., Greensburg.
Bird, J. E., New Albany.
Bitting, A. W., West Lafayette.
Bitz, J. F., Evansville.
Black, C. M., Warren.
Black, F. W., Ligonier.
Black, W. C., Marion.
Blair, J. S., Lynn.
Blair, W. W., Princeton.
Bland, C., Greensburg.
Bland, H. E, Fairbanks
Blinks, E. G., Michigan City.
Bloomer, F. H., Lagro.
Bloomfield, E. M., Peru.
Blossom, J. C., Mt. Summit.
Blount, R. D., Valparaiso.
Blount, R. F., Wabash.
Blount, R. T., Homer.
Bloxsom, A. W., Pennville.
Blue, C. L., Tocsin.
Bockover, C., Briant.
Bockover, S. Marion, Briant.

Boggs, W. R., Salem.
Bohman, R. M., Ft. Wayne.
Bohn, J. C., Terre Haute.
Bolling, L. A., Attica.
Bond, C. S., Richmond.
Bond, E. S., Richmond.
Bond, Marc L., Aurora.
Boner, G. H., Loogootee.
Boone, B. H., Boggstown.
Boor, M. A., Terre Haute.
Bopp, W. H., New Salisbury.
Boral, Wm. P., Sandborn.
Boram, E. V., Anderson.
Boren, S. W., Poseyville.
Borley, E. R., South Bend.
Borton, T. Artemus, Plymouth.
Bosenbury, C., South Bend.
Boston, Ch. H., Bradford.
Botkin, C. L., Farmland.
Bottorff, John C., Corydon.
Botts, E. H., Zanesville.
Boulder, M. F., Frankfort.
Bounell, H. M., Waynetown.
Bounell, T. A., Jamestown.
Bowell, B. O. Carr, Laporte.
Bowen, Eugene, Vincennes.
Bowen, J. F., Rushville (R. R.)
Bowen, M. F., Kendallville.
Bower, G. B. M., Ft. Wayne.
Bower, Jno. V., Malott Park.
Bowers, L. G., Richmond.
Bowers, Whitfield, Michigan City.
Bowker, Jas. J., La Otto.
Bowles, H. S., Muncie.
Boyd, C. E., West Baden.
Boyd, C. L., Paoli.
Boyd, C. L., Vincennes.
Boyd, H. B., Cambridge City.
Boyd-Snee, H., South Bend.
Boyden, C. F., Evansville.
Boyden, W. H., Anderson.
Boyers, James S., Decatur.
Bradfield, Jno., Logansport.
Bradley, J. P., Abington.
Brady, T. R., Wabash.
Bramkamp, A. L., Richmond.
Brandon, W. S., Daleville.
Brannon, Charles D., Crown Point.
Braxtan, T. N., Loogootee.
Brayton, A. W., Indianapolis.
Brayton, N. D., Indianapolis.
Breaks, L. Z., Terre Haute.
Brendell, John F., Zionsville.
Brent, I. N., Jamestown.
Bridge, L. M., Marion.
Briggs, C. F., Sullivan.
Brill, Jas. H., Indianapolis.
Brodbeck, George H., Roann.
Brokaw, R. E., Portland.
Brose, L. D., Evansville.
Broughton, F. A., Waterloo.
Broughton, F. H., Wolcottsville.
Brown, A. W., Bluffton.
Brown, A., Rochester.
Brown, Archibald, Rochester.
Brown, A. S., Cool City.
Brown, Benj. A., Indianapolis.
Brown, E. A., Indianapolis.
Brown, G. W., Frankfort.
Brown, J. R., Sumption Prairie.
Brown, L. E., Ft. Wayne.
Brown, T. F., Sanford.
Brownback, O. W., Pendleton.
Brubaker, E. H., New Castle.
Brubaker, E. H., West Middleton.
Brucker, C. M., Tell City.
Brudi, G. G., New Haven.
Bruggeman, H. O., Ft. Wayne.
Bruner, C. K., Greenfield.
Bruner, Mary L., Greenfield.
Bruning, Louise, Evansville.
Brunker, James Riley.
Brunson, V. O., Newville.
Bryan, E. A., Vincennes.
Bryan, T. L., Evansville.
Buchanan, W. A., Hammond.
Buchman, A. P., Ft. Wayne.
Buck, D. A., Laporte.
Buck, G. M., Burrows.
Bucklin, G. W., Muncie.
Bulla, J. M., Richmond.
Bulla, M. S., Gas City.
Buche, F. P., Richmond.
Bullitt, Thos. W., River Vale.
Bulson, Albert E., Jr., Ft. Wayne.
Burcham, H. C., Richmond.

Burckhardt, Louis, Indianapolis.
Burke, George, Wabash.
Burkel, J. C., New Ross.
Burley, David M., Vincennes.
Burlingame, E. G., Oakland City.
Burlington, J. R., Attica.
Burroughs, J. P., Westport.
Burton, A. R., Princeton.
Busjahn, F. A., Logansport.
Busse, E. P., Evansville.
Butler, W. F., Stockwell.
Butler, W. H., Columbus.
Butterworth, C. M., South Bend.
Button, C. E., Crown Point.
Buxton, Eva., Rockport.
Byers, O. A., Petersburg.
Byrns, J. D., Mitchell.

Cabell, A. L., Terre Haute.
Cady, N. W., Logansport.
Caffee, A. H., Terre Haute.
Caffee, B. V., Terre Haute.
Cain, D. B., Evansville.
Callam, M. D., Flora.
Calvert, J. H., Milton, Ky.
Calvin, J. C., Ft. Wayne.
Calvin, W. D., Ft. Wayne.
Cameron, J. F., Hamilton.
Cameron, V. V., Marion.
Camp, W. E., Clarksville.
Campbell, Cyrus W., Hammond.
Campbell, Frank, Shelbyville.
Campbell, R. M., West Point.
Cambpell, T. B., West Lebanon.
Campbell, W. S., Lafayette.
Caney, P. H., Vincennes.
Canady, C. E., New Castle.
Cannon, G. H., New Albany.
Cannon, J. H., South Bend.
Caplinger, C. A., Wallace.
Carey, W. W., Ft. Wayne.
Carl, O. U., Peru.
Carlisle, P. G., East Connersville.
Carmichael, C. S., Seelyville.
Carnelly, Jas. H., Kokomo.
Carnes, Z., Greenwood.
Carney, C. E., Delphi.
Carney, J. E., Pyrmont.
Carson, J. C., Valparaiso.
Carson, L. O., Traders Point.
Carson, S. L., Lincoln City.
Carter, Amos, Plainfield.
Carter, Calvin, Brookville.
Carter, H., Bringhurst.
Carter, Laura, Shelbyville.
Carver, W. F., Albion.
Case, M. T., Attica.
Case, W. W., Zenas.
Casebeer, I. N., Newport.
Casebeer, J. B., Auburn.
Casey, N. Austin, Silver Lake.
Casper, John, Jasper.
Cauble, Wm. C., Salem.
Caylor, C. E., Pennville.
Cecil, A. A., Muncie.
Chafee, Wm. C., Huntington.
Chamberlin, Cameron, Indianapolis.
Chambers, B. F., Lyons..
Chancellor, S. R., Kokomo.
Chaney, G., Portland.
Chappell, R. S., Indianapolis.
Charles, Etta, Summitville.
Charlton, Fred R, Indianapolis.
Chenoweth, E. B., Quincy.
Chenoweth, F. A., Winchester.
Chenoweth, N. T., Parker City R. R.
Chevigny, J. A. J., Hammond.
Chidlow, A., Hammond.
Chittenden, E. W., Anderson.
Chittick, Andrew J., Burlington.
Chittick, Charles, Frankfort.
Christian, Wilmer, Indianapolis.
Christie, James H., Canaan.
Clapper, Manton M., Hartford City.
Clark, C. S., Decatur.
Clark, D. D., Decatur.
Clark, E. D., Indianapolis.
Clark, J. B., Economy.
Clark, J. H., Connersville.
Clark, J. I., Owensville.
Clark, Joseph H., Princeton.
Clark, J. T., Hammond.
Clark, N. W., Rossville.
Clark, Robert J., Monticello.
Clark, S. A., South Bend.
Clark, S. R., Union.

Clauser, A. C., Delphi.
Clawson, J. W., Cedar Grove.
Clayton, George R., Monon.
Clements, H. J., Converse.
Cleveland, Ch. W., Michigan City.
Cleveland, W. F., Evansville.
Cleveland, W. R., Evansville.
Clevenger, W. F., Indianapolis.
Cline, George F., Scottsburg.
Cline, Lewis C., Indianapolis.
Clokey, M. C., Huntington.
Close, T. H., Scottsburg.
Clouse, Bertha A., Hope.
Cluthe, William, Tell City.
Coble, A. H., Frankfort.
Coble, Jacob, Spencer.
Coble, Ralph, Spencer.
Cochran, I. N., Delphi.
Cochran, R. W., Madison.
Cochran, T. C., Kokomo.
Cohen, David, Jeffersonville.
Colburn, C. P., Richmond.
Cole, A. M., Indianapolis.
Cole, W. H., Switz City.
Coleman, C. Augustus, Bloomington.
Coleman, J. W., Petersburg.
Coleman, W. H., Evansville.
Coleman, W. S., Rushville.
Collings, T. Jesse, Mecca.
Collins, A. W., Anderson.
Collins, C. C., Roachdale.
Combs, C. N., Terre Haute.
Combs, Geo. W., Indianapolis.
Combs, M. R., Terre Haute.
Comstock, J. A., Greenfield.
Conger, C. W., Indianapolis.
Conley, L. H., Gas City.
Connelly, H. M., Shelbyville.
Conover, Earl, Evansville.
Conrad, E. M., Anderson.
Conway, P. W., Ockley.
Cook, B. H., Anderson.
Cook, Charles J., Indianapolis.
Cook, Charles P., New Albany.
Cook, Clark, Fowler.
Cook, George J., Indianapolis.
Cook, J. A., Goshen.
Cook, J. H., Terre Haute.
Cook, J. W., Pendleton.
Cook, L. H., Bluffton.
Cook, R. T., Solsberry.
Cook, Wm. M., Lagrange.
Coombs, David, Charlestown.
Cooper, A. M., Muncie.
Cooper, Ernest, Plainfield.
Cooper, J. A., Terre Haute.
Cooperider, J., Madison.
Copeland, Charles C., Madison.
Copeland, Geo., Moorefield.
Copeland, R. M., Bennington.
Corbin, E. M., Sullivan.
Corey, Charles W., Hartford City.
Cosby, George O., Elizabethtown, R.F. D., 18.
Costello, H. F., Decatur.
Cottingham, Chas. E., Indianapolis.
Cottingham, I. E., Evansville.
Cotton, C. C., Elwood.
Cotton, S. M., Goldsmith.
Coulson, S. B., Jackson Hill.
Courtney, Thomas E., Indianapolis.
Coverdale, Earl G., Decatur.
Coverdale, J. S., Decatur.
Coverston, J. W., Frankfort.
Cowan, E. H., Crawfordsville.
Cowen, Louis C., Rising Sun.
Cowing, H. A., Muncie.
Cox, C. E., Cannelton.
Cox, C. R., Lynn.
Cox, D. A., Howell.
Cox, Edgar, Kokomo.
Cox, L. T., Napoleon.
Cox, N. D., Spencer.
Craig, J. A., Greenwood.
Craig, T. E., Lawrenceburg.
Cramm, C. J., Evansville.
Cramm, George W., Fulda.
Crampton, Charles C., Delphi.
Crapo, G. W., Terre Haute.
Cravens, E. R., Linton.
Cravens, William R., Bloomfield.
Crawford, E. F. W., Hanna.
Crawford, G. S., Milford.
Cray, Arthur B., Monticello.
Creel, T. J., Angola.
Cremeans, W. C., Mt. Vernon.

Crismond, J. W., Anderson.
Cromer, L. G., Union City.
Cromer, Mary, Union City.
Cronk, C. F., Wolcott.
Crose, Samuel E., Indianapolis.
Crowder, J. R., Sullivan.
Crull, E. A., Ft. Wayne.
Crum, Claude C., Jeffersonville.
Crum, Wayne H., Sellersburg.
Crumpacker, C. D., South Bend.
Crumrine, I. S. J., Landess.
Culbertson, Scott, Vevay.
Culmer, W. N., Bloomington.
Culp, L. L., Ft. Wayne.
Cummings, D. J., Medora.
Cummings, D. J. Jr., Ewing.
Cummings, S. M., Elkhart.
Cunningham, J. M., Indianapolis.
Current, O. E., Farmland.
Curtiss, W. H., Frankfort.
Cushman, A., Graysville.
Cushman, R. A., Princeton.
Cuthbert, F. S., Tangier.

Daily, J. M., Rockport.
Daily, W. W., Stanley.
Dale, B. C., Marion.
Dale, Omar E., Alquina.
Dancer, Chas. R., Ft. Wayne.
Dancer, Chas. W., Stroh.
Daniel, William, Corydon.
Daniels, George, Marion.
Daniels, G. W., Sweetser.
Danner, Rufus J., Elnora.
Darby, A. B., Waterloo.
Darroch, S. C., Cayuga.
Darroch, W. P., Cayuga.
Daugherty, C. A., South Bend.
Davenport, H. F., North Vernon.
Davenport, William H., Vincennes.
Davidson, A. W., Brownsburg.
Davidson, E. C., Lafayette.
Davidson, J. F., Crawfordsville.
Davidson, W. R., Evansville.
Davis, A. T., Marion.
Davis, C. P., Galena.
Davis, Elmer J., Mooreland.
Davis, F. L., Evansville.
Davis, John Q., Indianapolis.
Davis, L. N., Farmland.
Davis, Royce, Decker.
Davis, T. H., Richmond.
Davis, W. M., Worthington.
Davis, Wm. S., Marshall.
Davisson, Henry C., Hartford City.
Dean, E. R., South Bend.
DeForest, D. A., Booneville.
DeForest, D. F., Boonville.
Defrees, H. J., Napanee.
DeHass, T. W., Indianapolis.
Deilman, F. C., Fulton.
Delancey, S. S., Williamsport.
DeLong, O. A., Azalia.
Deming, N. L., Ft. Wayne.
Demotte, Jerome, Odon.
Denbo, Wm. R., Mockport.
Denant, M. S., Walkerton.
Denny, Charles, Belleview.
Denny, George E., Madison.
Denson, H. A., Indianapolis.
Depew, E. W., Wolf Lake.
Deputy, E. M., Dugger.
Derbyshire, E., Connersville.
DeVaux, Edward F., Ft. Wayne.
DeWeese, L., Hemlock.
Dewey, E. L., Hammond.
Dewey, F. N., Elkhart.
Dicken, C. L., Lafontaine.
Dickes, J. T., Portland.
Dickey, A. S., Tipton.
Diefendorf, C. F., Booneville.
Didlake, M. T., Monticello.
Dierking, A. W., Oolitic.
Dilley, Fred C., Brazil.
Dillinger, J. R., French Lick.
Dillman, L. D., Connersville.
Dings, W. H., Mitchell.
Dinnen, James M., Ft. Wayne.
Dinsmore, Walter H., Kramer.
Dippell, Emil T., Huntington.
Dixon, H. F., Evansville.
Dobbins, A. D., Wheeler.
Dobbyns, P. K., Franklin.
Dodds, W. T. S., Indianapolis.
Doerr, J. E., Mt. Vernon.
Dollens, T. C., Trinity Springs.

Domer, W. A., Wabash.
Donaldson, A. I. Washington.
Donica, T. N., Tunnelton.
Donnelly, J. E., Terre Haute.
Dooley, R. L., Montezuma.
Dooley, M. M., Loogootee.
Doolittle, B. M., Ft. Wayne.
Dorsey, Francis O., Indianapolis.
Douglas, Dilver E., E. Enterprise.
Dove, S. C., Westfield.
Dowden, Ch. W., West Baden.
Downey, L. J., Vincennes.
Drake, Jas. F., Youngstown.
Drake, Morris, Shelbyville.
Drayer, L. P., Ft. Wayne.
Dresch, C. A., Mishawaka.
Drescher, Marie L., Michigan City.
Driscoll, C. C., Lafayette.
Druley, O. E., Anderson.
Dryer, D. W., Lagrange.
Dubois, E. J., Indianapolis.
Dubois, F. T., Liberty.
Duddenhausen, W. C., Evansville.
Duemling, H. A., Ft. Wayne.
Dugan, Thos. J., Indianapolis.
Dugdale, R. B., South Bend.
Duncan, J. B., Bedford.
Duncan, Wm. F., Manchester.
Dunham, F. H., Richmond.
Dunlavey, I. E., Indianapolis.
Dunn, W. H., Gaston.
Dupuy, Charles, Riley.
Durham, Charles O., Indianapolis.
Durham, J. L., Graysville.
Dutrow, C. E., Bristol.
Dutton, H. H., Judson.
Dyer, E. W., Ossian.

Earp, R. B., Dunkirk.
Earp, S. E., Indianapolis.
Eash, S. M., Shipshewana.
Easley, E. P., New Albany.
Eastman, F. P., South Bend.
Eastman, J. R., Indianapolis.
Eastman, T. B., Indianapolis.
Eberhard, E. L., South Whitley.
Eberhardt, W., Michigan City.
Eby, H. W., Goshen.
Eckelman, F. C., Elkhart.
Eckelman, M. M., Elkhart.
Edenharter, George F., Indianapolis.
Edmunds, O. E., Frankfort.
Edwards, C. H., Sullivan.
Egan, B. W., Carroll.
Egolf, H. F., Liberty.
Eichel, S. J., Evansville.
Eidson, J. W., Bourbon.
Eikenberry, A. A., Peru.
Eisenbeiss, C. M., Elkhart.
Eley, Lorenzo D., Plymouth.
Elfers, John, Rising Sun.
Elliott, H. H., Glenwood.
Elliott, James, Terre Haute.
Elliott, J. W., Linden.
Elliott, R. H., Connersville.
Elliott, J. C., Guilford.
Elliott, R. M., Needham.
Elrod, E. L., Henryville.
Elrod, M. N., Columbus.
Elrod, S. B., Raglesville.
Emery, C. H., Bedford.
Emmert, E. J., Lawrenceburg.
Emmick, T. C., Mt. Vernon.
Empson, Blaine, Seymour, R. R.
Engleman, M. P., Reese Mills.
Englerth, J. T., Honey Creek.
English, C. H., Ft. Wayne.
English, J. P., Terre Haute.
Enslen, Wm. M., Ft. Wayne.
Ensminger, S. L., Crawfordsville.
Epperson, Adah, South Bend.
Erdman, Bernhard, Indianapolis.
Eshelman, L. H., Marion.
Etter, J. R., Crawfordsville.
Evans, Caleb S., Union City.
Evans, E. A., Rosedale.
Evans, E. B., Greencastle.
Evans, H. M., Valparaiso.
Evans, J. J., Winchester.
Evans, John M., Mellott.
Ewing, U. B. G., Richmond.

Fagaly, A. T., Lawrenceburg.
Fair, H. D., Muncie.
Fairfield, W. J., Anderson.
Faith, Abraham, H., Evansville.

Fankboner, W. A., Marion.
Famulener, L. W., Bloomington.
Farrabee, E. C., Indianapolis.
Farver, M. A., Middlebury.
Fattic, John B., Anderson.
Ferguson, A. M., Huntington.
Ferguson, C. E., Indianapolis.
Ferguson, W. A., Brighton.
Fernald, W. J., Frankfort,
Ferrell, J. E., Eden.
Ferris, Edgar S., New Castle.
Field, W. H., Evansville.
Finch, Gilbert, Center Point.
Fink, H. A., South Bend.
Fink, O. E., Terre Haute.
Finley, George W., Brazil.
Finney, Charles J., Attica.
Fisher, A. L., Elkhart.
Fisher, E. S., Markle.
Fitch, A. P., Lebanon.
Fitzgibbon, John, Washington.
Fitzpatrick, B., Columbus.
Fleetwood, B., Linton.
Fleming, C. F., Elkhart.
Fleming, C. F., Wabash.
Fleming, J. C., Elkhart.
Fletcher, C. I., Indianapolis.
Floyd, Benj. L. W., Evansville.
Flucks, Carl, St. Wendell.
Flynn, E. N., Jeffersonville.
Flynn, Wm., Marion.
Fodrea, Z. H., Westfield.
Folsom, E. M., Boonville.
Ford, J. H., Indianapolis.
Ford, Katherine C., Indianapolis.
Ford, L. W., Syracuse.
Ford, O. P. M., Rising Sun.
Ford, W. P., Boonville.
Foreman, W. H., Indianapolis.
Fortune, J. L., Terre Haute.
Fosler, D. W., Indianapolis.
Foust, P. G., Santa Fe.
Fouts, J. M., Centerville.
Fowler, W. E., Lagrange.
Fox, Henry A., Gosport.
Foxworthy, Frank W., Indianapolis.
Francis, E. T., Columbus.
Franks, H. P., Muncie.
Franks, O. P., Brimfield.
Franks, W. H., Ligonier.
Frazer, Charles, Muncie.
Freeland, John L., Indianapolis.
Freeland, John T., Bedford.
Freeman, E. D., Osgood.
Freeman, Geo., Shoals.
Freeman, Joseph, Sullivan.
Fretz, J. C., Deedsville.
Frick, H. C., Evansville.
Frink, C. W., Elkhart.
Frisz, Joseph A., Terre Haute.
Fritsch, L. J., Evansville.
Fritsch, W. A., Evansville.
Frost, R. F., Huntington.
Fry, Chas. W., Huntington.
Fry, B. C., Indianapolis.
Fulenwider, H. L., Rigdon.
Fuller, W. H., North Vernon.
Fullinwider, C. H., Mt. Vernon.
Fulton, George E., Bluffton.
Fulton. John C., Bluffton.
Funk, Austin, Jeffersonville.
Funk, C. C., New Albany.
Funk, Z. T., Corydon.
Furniss, S. A., Indianapolis.

Gabe, Harry E., Indianapolis.
Gabel, H., Centerville.
Gaddy, O., Paris Crossing.
Galbreth, J. P., Burnettsville.
Galbreth, W. H., Rockfield.
Galloway, N. G., South Bend.
Gantz, Thos., Freedom.
Garber, E. C., Dunkirk.
Garber, J. B., Dunkirk.
Gardner, Fletcher, Bloomington.
Gardner, Lucy W., Bloomington.
Gardiner, C. A., Kendallville.
Garr, J. O., Kokomo.
Garrett, F. W., Liberty Center.
Garrett, John D., Indianapolis.
Garretson, W. M., Perkinsville.
Garshweiler, Wm. P., Indianapolis.
Garstang, R. W., Indianapolis.
Gaterer, J. A., New Albany.
Geary, J. K., Ft. Wayne.
Geisinger, Lewis N., Auburn.

Gemmill, H. C., Indianapolis.
Gentle, L. M., Milton.
Gerard, R. H., Crawfordsville.
Gerrish, M. F., Seymour.
Gerrish, W. D., Clinton.
Gers, Henry, Washington.
Gibbons, G. L., Huron.
Gibbons, J. A., Mitchell.
Gibbs, J. C., Crown Point.
Gibson, J. J., Alexandria.
Giffen, R. I., Lagro.
Gifford, A. W., Tipton.
Gifford, Jos. C., Brazil.
Gilbert, J. L., Logansport.
Gilbert, Joseph L., Kendallville.
Gilbert, W. H., Evansville.
Gilkison, J. S., Loogootee.
Gilkison, Wm., Logootee.
Gillespie, C. E., Crothersville.
Gillespie, J. T., Greencastle.
Gillum, W. H., Rockville.
Gillum, J. R., Terre Haute.
Gilpin, J. H., Ft. Wayne.
Ginn, J. F., Elwood.
Given, C. E., Lewis.
Glenn, Marion, Vincennes, R. R. 9.
Glover, John F., Evansville.
Goar, C. S., Indianapolis.
Goba, Bertha, Ft. Wayne.
Goebel, William, Elkhart.
Good, A. H., Muncie.
Good, Charles H., Warren,
Goodin, S. A., Bluffton.
Goodrich, C. D., Elkhart.
Goodrick, C. E., Peru.
Goodwin, C. B., Kendallville.
Goodwin, Grant, Monticello.
Gordin, S. E., Alquina.
Gordon, Chas. W., Ft. Wayne.
Goshorn, Leonard, Hymera.
Goss, M., Rockville.
Gould, C. E., Rochester.
Gould, S. W., Argos.
Gottman, H. N., Evansville.
Graessle, G. G., Seymour.
Graham, Alois B., Indianapolis.
Graham, Hannah, Indianapolis.
Graham, Nathan P., Madison.
Graham, O. M., Geneva.
Graham, Oliver P., Jeffersonville.
Graham, W. B., Noblesville.
Grant, G. H., Richmond.
Gravis, C. M., Martinsville.
Gray, J. L., Laporte.
Gray, Jno. W., Bloomfield.
Grayston, B. H. B., Huntington.
Grayston, Charles E., Huntington.
Grayston, Fred W., Huntington.
Green, D. M., Muncie.
Green, E. V., Martinsville.
Green, F. H., Rushville.
Green, G. R., Muncie.
Green, J. H., North Vernon.
Green, Thomas C., Albion.
Green, T. G., Shelbyville.
Green, W. T., Albion.
Greenawalt, G. L., Ft. Wayne.
Greene, J. B., Mishawaka.
Greenleaf, G. F., Evansville.
Gregg, Joseph W., Brazil.
Gregory, Henry, Laurel.
Greist, H. W., New Castle.
Griffis, W. T., Fountain City.
Griffin, L. B., Greenfield.
Griffith, J. B., Alamo.
Griffith, M. J., Crawfordsville.
Griffith, T. J., Crawfordsville.
Grim, Simon, Caborns.
Grishaw, H. E., Tipton.
Grisie , F. G., Columbia City.
Griswold, E. H., Peru.
Gronendyke, O. J., New Castle.
Gronendyke, T. W., New Castle.
Gross, W. O., Ft. Wayne.
Grover, C. B., Greensburg.
Grubb, Albert G., Mongo.
Gudgel, Harry B., Hazleton.
Gudgel, J. E., Cynthiana.
Gwaltney, S. P., Chrisney.

Hackleman, F. G., Rushville.
Hackley, R. P., Medaryville.
Hadley, James W., Frankfort.
Hagenbaugh, Elmer J., Elkhart.
Hager, W. A., South Bend.
Haggerty, R. I., Elkhart.

Hale, M. M., Wabash.
Hale, N. T., Wabash.
Hall, J. E., Alexandria.
Hall, H. J., Franklin.
Hall, H. M., Millersburg.
Hall, Jos., Logansport.
Hall, J. W., Portland.
Hall, M. L., Newport.
Hall, Silas, Vincennes.
Hall, F. J., Caborns.
Hallanan, Joseph A., Logansport.
Hannell, R. V., Lafayette.
Hamer, H. G., Indianapolis.
Hamilton, A. A., Marion.
Hamilton; Allen, Ft. Wayne.
Hamilton, A. N., Waynetown.
Hamilton, E. Everett, Connersville.
Hamilton, N. C., Kokomo.
Hamilton, S. N., Connersville.
Hampton, S. E., Milton, Ky.
Hancock, C. F. C., Jeffersonville.
Hani, W. F., Elkhart.
Hanna, J. E., Clarksville.
Hanna, L. M., Greencastle.
Hannell, Roy V., Lafayette.
Hansel, C. A., South Bend.
Hardesty, J. C., New Castle.
Hardman, W. E. N., Manchester.
Hardwick, R. L., Mt. Vernon.
Hardy, J. S., Lebanon.
Harpole, C. B., Evansville.
Harrah, J. M., Switz City.
Harris, C. E., Bloomington.
Harris, J. E., Bloomington.
Harris, O. K., Elletsville.
Harris, Robt., New Albany.
Harris, W. W., Elletsville.
Harrison, W. H., Kokomo.
Harrod, N., Tampico.
Harrold, E. O., Marion.
Harrold, John R., Roll.
Hart, Bruce D., Columbus.
Harter, Harry, Newtonville.
Harter, J. H., Anderson.
Harter, W. P., Anderson.
Hartloff, C. W., Evansville.
Haslep, Marie, Indianapolis.
Hassenmiller, M., West Baden.
Harwood, Ch. P., Milton, Ky.
Hatfield, I. N., Bluffton.
Hatfield, S. J., Indianapolis.
Hauenstein, G. W., Elkhart.
Haughton, R. E., Richmond.
Havice, S. H., Ft. Wayne.
Hawes, James K., Columbus.
Hawkins, E., Greencastle.
Hawkins, Madge P., Terre Haute.
Hawkins, Robert W., Brazil.
Hawley, W. H., College Corner, Ohio.
Hawn, C. E., Little York.
Haworth, M. C., Noblesville.
Hayden, A. M., Evansville.
Hays, John W., Albion.
Haynes, W. H., Aurora.
Hays, Franklin W., Indianapolis.
Hays, T. A., Burns City.
Hazel, James T., Freedom.
Hazelwood, John, New Albany.
Heath, Frederick C., Indianapolis.
Hebble, D., Ellsworth.
Heberer, J. M., Evansville.
Heiman, L., Evansville.
Held, Henry W., Vincennes.
Heller, Fred, Brownstown.
Helm, Charles J., Peru.
Helms, W. M., Williamsburg.
Hemphill, F. H., Seeleyville.
Henderson, Samuel, Howell, R. R
Hendricks, W. E., Martinsville.
Henley, G., Fairmount,
Henning, Carl, Hanover.
Henry, T. C., Cowan.
Henry, W. C., Aurora.
Henson, Theo., Martinsville.
Herr, Henry, Washington.
Herbert, S. Z., Evansville.
Herrmann, Franz J., Logansport.
Hershey, F. C., Carmel.
Hershey, K. C., Carmel..
Hervey, Minnie E., Richmond.
Heskett, W. C., Bloomington.
Hess, F. C., Cadiz.
Hess, J. N., New Marion.
Hessler, Robert, Logansport,.
Hester, R. F., Bloomingdale.
Hestler, O. J., Blountsville.

Hetherington, J. P., Logansport.
Hetrick J., Ft. Wayne.
Heusler, Ernest C., Howell, R. R.
Hewins, W. A., Chandler.
Hiatt, J. E., New Castle.
Hickman, C. C., Yeoman.
Hicks, C., Mt. Vernon.
Hicks, Jas. M., Huntington.
Hicks, J. L., Arcadia.
Hicks, L. F., Stilesville.
Hiestand, H. J., Indianapolis.
Higgins, J. B., Peru.
Hildebrand, W. O., Topeka.
Hill, F. E., Muncie.
Hill, Henry B., Logansport.
Hill, J. W., South Bend.
Hill, L. B., Seymour.
Hillis, J. D., Lafayette.
Hines, F. M., Auburn.
Hines, W. L., Warsaw.
Hinkle, E. I., Goldsmith.
Hoadley, W. J., Danville.
Hoag, W. I., Indianapolis.
Hoagland, C. S., Milroy.
Hobbs, Alice L., Indianapolis.
Hobbs, H. C., Salem.
Hobday, W. A., Louisville, Ky.
Hodges, E. F., Indianapolis.
Hodges, Fletcher, Indianapolis.
Hodson, Geo., Evansville.
Hoggatt, W. W., French Lick.
Holder, R. E., Columbus.
Holder, Union H., Washington.
Holland, G. F., Bloomington.
Holland, J. E. P., Bloomington.
Holland, P. C., Bloomington.
Hollenbeck, B. W., Westville.
Holliday, D. A., Fairmount.
Holliday, L. D., Fairmount.
Hollingsworth, A. S., Goshen.
Hollingsworth, Ernest, Washington.
Hollingsworth, M. P., Princeton.
Hollingsworth, S. G., Brazil.
Hollis, Ella A., Hartford City.
Hollis, Samuel, Hartford City.
Hollis, Wm. Allen, Hartford City.
Holloway, Marie L., Decatur.
Holloway, O. E., Knightstown.
Holloway, W. A., Logansport.
Holly, A. C., Attica.
Holmes, Ella Sullivan, Aurora.
Holton, Ch. E., Holton.
Holton, William, New Harmony.
Holtzendorff, A. C., Plymouth.
Holtzendorff, C. F., Plymouth.
Holtzman, Rice C., Stinesville.
Hon, A. W., Indianapolis.
Hood, Thomas C., Indianapolis.
Hoopingarner, G. P., Elkhart.
Hoover, Enos M., Elkhart.
Hoover, Guy, Boonville.
Hoover, L., Decker.
Hoover, P. N., Boonville.
Hope, C. F., Coatsville.
Hopkins, R. R., Richmond.
Hopkins, W. G., Ft. Branch.
Hopper, M. S., Lafayette.
Horn, A. H., Putnamville.
Hornocker, S. D., Silverville.
Hoskins, G. H., Whiting.
Hoskins, Walter D., Indianapolis.
Hostetler, A. J., Lagrange.
House, G. H. F., Indianapolis.
House, John W., Indianapolis.
Houseman, Kate, Muncie.
Houser, B. A., Wabash.
Howard, F. M., St. Paul.
Howard, C. U., Warsaw.
Howard, J. L., West Baden.
Howard, Noble P., Greenfield.
Howat, W. F., Hammond.
Howerth, Cora, Valparaiso.
Howes, Jas. W., Bowling Green.
Hoy, B. F., Syracuse.
Huber, J. G., Evansville.
Hudson, M. D., Evansville.
Huff, O. N., Fountain City.
Huffman, G. E., Long Cliff.
Huffman, W. G., Richmond.
Hughes, W. L., Indiana Harbor.
Hughes, Wm. F., Indianapolis.
Hull, Chester E., Ft. Wayne.
Humphreys, F. B., Angola.
Hunt, B. S., Winchester.
Hunt, F. P., Leipsic.
Hunt, John S., W. Terre Haute.

Hunt, Lee F., Anderson.
Hunt, Stephen, Plainfield.
Hunt, W. A., Lynnville.
Hunter, F. S., Bedford.
Hunter, John R., Huntington.
Hunter, W. M., Petersburg.
Hupe, Charles, Lafayette.
Hurst, E. M., Cloverdale.
Hurt, G. K., Thorntown.
Hurty, John N., Indianapolis.
Hutcheson, W. R., Greencastle.
Hutchings, B. F., Crawfordsville.
Hutchings, B. M., Terre Haute.
Hutchings, F. F., Indianapolis.
Hutto, H. W., Sharpesville.
Hutto, O. D., Kokomo.
Hyde, L. A., Linton.

Ihrig, F. M., Goshen.
Imel, E. S., Petersburg.
Ingle, C. V., Evansville.
Inks, J. S., Napanee.
Inlow, G. I., Blue Ridge.
Inlow, I. N., Blue Ridge.
Ingalls, Albert T., Elkhart.
Ireland, G. L., Winslow.

Jackson, G. B., Indianapolis.
Jackson, J. M., Lyons.
Jackson, F. G., Muncie.
Jaeger, A. S., Indianapolis.
James, N. A., St. Meinrad.
James, Oliver, Brazil.
Jameson, Henry, Indianapolis.
Jacquith, O. S., Lawrenceburg.
Jay, M. T., Portland.
Jeffries, H. S., Upland.
Jenkins, Jennie, Richmond.
Jenkins, J. M., Cortland.
Jenkins, W. O., Terre Haute.
Jennings, Harriet B., Elkhart.
Jennings, W. L., Bridgeport.
Jerome, J. N., Evansville.
Jessup, Maria A., Friendswood.
Jett, F. H., Terre Haute.
Jewett, L. E., Wabash.
Jobes, N. E., Indianapolis.
Johns, Elmer D., Zionsville.
Johnson, Francis W., Utica.
Johnson, J. E., Marion.
Johnson, L. B., Ireland.
Johnson, C. E., Otis.
Johnson, Luther, Bourbon.
Johnson, P. S., Richmond.
Johnson, W. H., Brightwood.
Johnston, A., Akron.
Johnston, David E., Moores Hill.
Johnston, M. A., Oaktown.
Johnston, M. F., Richmond.
Johnston, S. A., Indianapolis.
Jones, A. B., Lebanon.
Jones, Cadwalader. Charlestown.
Jones, George E., Evansville.
Jones, H. E., Anderson.
Jones, I. G., Vincennes.
Jones, Jay, Medaryville.
Jones, Jesse M., Cataract.
Jones, R. E., Clayton.
Jones, J. G., Versailes.
Jones, O. H., Crawfordsville.
Jones, T. M., Anderson.
Jordan, L. W., Wabash.
Jump, Ch. A., Selma.
Jump, S. G., Selma.
Justice, Wm. A., Greenfield.

Kahlo, Geo, D.. French Lick.
Kahn, David L., Indianapolis.
Kalbfleisch, A. H., Peru.
Kamman, G. H., Seymour.
Kamman, H. H., Columbus.
Kane, Alfred, Ft. Wayne.
Kaple, J. D., South Bend.
Kearns, T. A., Muncie.
Keeling, J. E., Waldron.
Keene, T. V., Indianapolis.
Keeney, B. G., Shelbyville.
Keeney, S. H., Indianapolis.
Keiper, G. F., Lafayette.
Kell, S. D., Liberty.
Keller, F. D., Alexandria.
Keller, H. E., Decatur.
Kelly, J. C., Mitchell.
Kelly, L. H., Hammond.
Kellog, W. F., Indianapolis.
Kelsay, C., Evansville.
Kelsey, T. W., Francisville.

Kelsey, A. J., Monterey.
Kelsey, W. E., Monterey.
Kelsey, William, Monterey.
Kelso, U. G., Dubois.
Kemp, Jos. W., Roanoke.
Kemp, O. P., Center.
Kemper, A. T., Muncie.
Kemper, G. W. H., Muncie.
Kemper, W. W., Muncie.
Kendal, Arnold P., Austin.
Kendall, C. W., Pine Village.
Kendle, G. C., Princeton.
Kennedy, Albert C., Patricksburg.
Kennedy, Bernays, Indianapolis.
Kennedy, C. M., Camden.
Kennedy, Samuel, Shelbyville.
Kennedy, T. C., Shelbyville.
Kennedy, W. H., Shelbyville.
Kentling, Joseph, Smithville.
Kercheval, C. F., Greensburg.
Kern, Aaron, Wabash.
Kern, Chas. B., Lafayette.
Kerrigan, J. J., Michigan City.
Kerth, J. H., Evan ville.
Kesler, A. J., Ft. Wayne.
Kessinger, W. E., Sandborn.
Ketcham, Jane, Indianapolis.
Keyes, O. M., Dana.
Keyes, P. H., Dana.
Kienzle, F. W., Greensfork
Kilgore, Frank, Dalesville.
Kimball, G. D., Marion.
Kimball, M. C., Converse.
Kimberlin, A. C., Indianapolis.
Kime, J. T., Petersburg.
Kimmel, A. J., Hudson.
King, C. H., Wabash.
King, H. O., Kendallville.
King, J. E., Richmond.
King, J. M., Greencastle.
King, M. O., Rochester.
King W. F., Columbia City.
King, Warren R., Greenfield.
Kirk, E. E., Spiceland.
Kirkpatrick, A. M., Columbus.
Kirby, G. W., Millersburg.
Kiser, Edgar F., Indianapolis.
Kirk, Elliott W., Veedersburg.
Kirth, F. E., Modoc.
Kister, George, Elberfeld.
Kistner, J. W., Elkhart.
Kitchell, J. E., Deer Creek.
Kitson, F. S. N., Manchester.
Klein, W. W., Bloomington.
Klingler, M. E., Garrett.
Knabe, Helene, Indianapolis.
Knapp, A. B., Washington.
Knapp, A. J., Evansville.
Knapp, B. J., Evansville.
Knapp, Charles, Evansville.
Knapp, George, Vincennes.
Knapp, Victor, Ferdinand.
Kneale, W. W., Anderson.
Knepple, Lamar, Wakarusa.
Knight, J. C., Jonesboro.
Knoefel, A. F., Linton.
Knott, D. C., Plymouth.
Knowlton, M., Terre Haute.
Knox, E. S., Indianapolis.
Kohr, T. W., Hammond.
Kolmer, John, Indianapolis.
Koons, H. H., New Lisbon.
Koontz, S., Roanoke.
Kratzer, E. F., Peru.
Krebs, M. H., Huntington.
Kreider, M. K., Goshen.
Kreider, W. B., Goshen.
Kremer, Fred, St. Magdelene.
Kremer, Nicholas A., Madison.
Krueger, F. W., Richmond.
Kuhn, B. F., Elkhart.
Kyle, John J., Indianapolis.

LaBier, C. R., Terre Houte.
Lairy, M. M., Lafayette.
Lake, G. B., Wolcottville.
Lamberson, Harry, Connersville.
Lambert, J. C., Colfax.
Lambert, J. L., Brazil.
Lanam, J. H., Franklin.
Landon, L. C., Priam.
Lane, W. H., Angola.
Langdon, Harry K., Indianapolis.
Laughead, J. T., Terre Haute.
Larkins, E. L., Terre Haute.
Laubscher, S. R., Evansville, R. R.

Lauer, A. J., Whiting.
Laughlin, C. E., Evansville.
Laval, W. J., Evansville.
Lawson, J. E., Corydon.
Lawson, W. T., Danville.
Layman, D. W., Indianapolis.
Layman, E. W., Terre Haute.
Laval, E. J., Evansville.
Laselle, G. M., Wabash.
Leach, W. J., New Albany.
Leathers, D. A., Indianapolis.
Leavitt, R., Terre Haute.
Lecrone, Ira, Silver Lake.
Ledbetter, J. M., Michigan City.
Lee, D. F., Zionsville.
Lee, G. W. H., Indianapolis.
Leeds, F. R., Michigan City.
Leedy, C. E., Pierceton.
Lemmon, S. W., Albion.
Lemon, H. K., Goshen.
Lent, E. J., South Bend.
Leonard, H. S., Indianapolis.
Letherman, A. P. Valparaiso.
Lett, O. A., Newburg.
Lett, O. E., Glendale.
Levering, Guy P., Lafayette.
Lewis, George F., Asheville.
Lewis, M. J., Marion.
Libbert, E. J., Aurora.
Lindley, C. M., Princeton.
Lindley, Laban, Paoli.
Lingle, S. L., Paoli.
Link, Goethe, Indianapolis.
Linthicum, E., Evansville.
Linville, D. S., Columbia City.
Littell, W. R., Cambridge City.
Little, John A., Logansport.
Little, P. B., Whitestown.
Lloyd, A. W., Marion.
Lockridge, A. B., Montezuma.
Lockwood, R. L., Elkhart.
Loehr, E. C., Noblesville.
Logan, A. R., Algiers.
Logan, H. V., New Salem.
Lohrmann, Henry, Indianapolis.
Long, J. A., Anderson.
Long, Charles R., Pierceton.
Long, H. H., Laporte.
Long, J. B., Indianapolis.
Longanecker, E. W., Anderson.
Longfellow, T. W., Tipton.
Lothrop, A. H., Lexington.
Loomis, Charles, Vevay.
Loop, A. L., Economy.
Lorenz, J. W., Evansville.
Lorimore, John H. C., Hartford City.
Loring, C. J., Rochester.
Loring, D. J., Valparaiso.
Loring, S. C., Plymouth.
Lowden, E. B., Hazleton.
Lowder, C. M., Dugger.
Lowder, H. R., Bloomfield.
Lowder, L. T., Bloomington.
Lower, M. O., North Manchester.
Luckett, L. P., Terre Haute.
Luckey, H. T., Seymour.
Luckey, J. E., Wolf Lake.
Ludwick, L. V., Connersville.
Lukemeyer, E. G. Huntington.
Lukemeyer, Louis, Huntington.
Lukenbill, L. C., Marco.
Lukenbill, O. C., Indianapolis.
Luzzadder, J. E., Smithville.
Lybrook, Wm. E., Young America.
Lyon, F. P., Flora.
Lyons, J. H., North Webster.

McAlexander, R. O., Indianapolis.
McAllister, E. B., Terre Haute.
MacBeth, A. H., Ft. Wayne.
MacBeth, Harriet S., Ft. Wayne.
McBeth, Walter, Burnettsville.
McBride, Isaac, Jeffersonville.
McCall, James, Terre Haute.
MacCammon, W., Laurel.
McCarty, M. T., Frankfort.
McCaskey, G. W., Ft. Wayne.
McClain, Leslie, Terre Haute.
McClain, Levi M., Scottsburg.
McClain, W. L., Scottsburg.
McClevey, D. A., Deer Creek.
McClintock, Chas. W., Pittsboro.
McClure, J. W., Butlerville.
McClure, Sher., W., Elrod.
McClurg, W. H., Kokomo.
McClurkin, J. C., Evansville.

McConnell, J. E., Carlisle.
McConnell, Maud, Indianapolis.
McCool, H. E., Evansville.
McCool, W. E., Evansville.
McCormick, R. S., Napanee.
McCoy, George T., Columbus.
McCoy, James N., Vincennes.
McCoy, P. Y., Evansville.
McCully, Charles H., Logansport.
McCutchan, J. H., Evansville.
McDonald, A. C., Warsaw.
McDonald, A. J., Bedford.
McDonald, David H., Quincey.
McDonald, F. G., Frankfort.
McDonald, J. A., Indianapolis.
McDonald, W. B., New Augusta.
McDowell, James D., Vincennes.
McDowell, M. M., Vincennes.
McEvoy, J. B., Ft. Wayne.
McFadden, W. C., Shelbyville.
McFarlan, C. C., Zenas.
McFarlin, John T., Williams.
McGaughey, William, Greencastle.
McGowan, J. W., Oakland City.
McGowan, T. J., Vincennes.
McGrew, F. A., Laporte.
McGuire, W. H., Frankfort.
McHugh, J. E., Ft. Wayne.
McIlvain, Helen K., Huntington.
McIntosh, John J., Vincennes.
McIntyre, C. W., New Albany.
McJohnston, W. E., Terre Haute.
McKamy, Anna, New Albany.
McKay, J. D., Marion.
McKeand, Robert, Lexington.
McKee, C. E., Dublin.
McKee, W. E., Tipton.
McKeenan, R. B., Ft. Wayne.
McKinney, J. W., Bluffton.
McKittrick, Ora K., Plainville.
McLeay, J. D., Indianapolis.
McMahan, Ada, Lafayette.
McMillen, W. W. P., Decatur.
McNamara, D. W., South Bend.
McNeal, Geo. L., Deer Creek.
McOscar, E. J., Ft. Wayne.
McPherson, S. L., Montgomery.
McQuown, O. W., Marion.
McWilliams, O. E., Anderson.
Maas, Alice M., New Albany.
Macer, E. C., Evansville.
Macer, Thomas, Evansville.
Mackey, C. W., Portland.
Maddox, O. E., Rockville.
Maddox, S. E., Montpelier.
Magers, F. M., Churubusco.
Mainwaring, W. H., Bloomington.
Mallett, C. D., Switz City.
Malone, B. E., Laporte.
Maloney, F. C., Avilla.
Malpas, S. H., Indianapolis.
Mann, E. B., Muncie.
Manring, N. H., Elwood.
Mansfield, T. J., Royerton.
Mapes, W. L., Terre Haute.
Maple, J. B., Shelburn.
Marchant, V. H., Haubstadt.
Maris, J. J., Paoli.
Markle, G. C., Winchester.
Markley, H. W., Bluffton.
Markley, S. C., Richmond.
Marsh, John L., Brownsburg.
Marshall, D. J., Columbus.
Marshall, Geo. D., Young America
Martin, A., Bellmore.
Martin, A. A., Kokomo.
Martin, C. A., Princeton.
Martin, E. A., South Bend.
Martin, F. A., Comiskey.
Martin, F. V., Michigan City.
Martin, G. H., Corydon.
Martin, H. H., Laporte.
Martin, J. S., Rolling Prairie.
Martin, Paul F., Indianapolis.
Martin, W. D., Oakland City.
Martin, Will J., Kokomo.
Martin, W. H. Kokomo.
Marvel, Charles, Richmond.
Marxer, C. W., Indianapolis.
Masgana, Emanuel, Vincennes.
Mason, E. R., Bloomfield.
Mason, George C., Oakland City.
Mason, L., Bluffton.
Mason, Samuel, Pennville.
Mason, Robert, Oakland City.
Masters, Luella M., Thorntown.

Masters, J. L., Indianapolis.
Matheney, T. G., Auburn.
Mathews, James, New Paris.
Mathews, W. R., Madison.
Matteson, J. A., Nat. Mil. Home.
Mattox, E. L., West Terre Haute.
Mattox, L. L., Geneva.
Mattox, W. R., Terre Haute.
Maughmer, G. C., Kokomo.
Mauk, J. R., Cambridge City.
Mavity, Everett, Fowler.
Maxam, F. H., Princeton.
Maxedon, T. H., Vincennes.
Maxwell, Allison, Indianapolis.
May, A., Crothersville.
May, Vance, Washington.
Mayfield, Marcellus, Royal Center.
Medaris, John W., Brookston.
Medsker, I. T., Indianapolis.
Meek, J. B., Abington.
Meiner, J. A., Alexandria.
Mendenhall, E. T., New Castle.
Mendenhall, F. F., Elwood.
Mennett, O. H., Columbus.
Mentzer, S. E., Monroeville.
Mercer, J. D., Poe.
Mercer, O. P., Reelsville.
Merson, U. H., Anderson.
Merz, G. H., Ft. Wayne.
Metcalf, H. P., Andersonville.
Metts, A. H., Ossian.
Metts, Fred, Ossian.
Metts, J. I., Ossian.
Meyer, J. H., William, Laporte.
Michaels, Jos. F., Montgomery.
Miles, James, Merom.
Miley, Isaiah, Anderson.
Miller, Anton, Russiaville.
Miller, B. E., Albion.
Miller, C. E., Muncie.
Miller, D. L., Goshen.
Miller, George D., Logansport.
Miller, Harry, Nat. Military Home.
Miller, H. C., Greentown.
Miller, H. H., Galveston.
Miller, H. M., South Bend.
Miller, James M., Decatur.
Milligan, Chas. E., Winchester.
Milligan, J. W., Michigan City.
Millis, E. D., Plainville.
Mills, C. C., Redkey.
Mills, W. F., South Bend.
Mills, W. H., Boonville.
Minnick, Horace R., Idaville.
Minnich, W. T., Somerset.
Miranda, W. F., Walkerton.
Misener, Walter L., Mechanicsburg.
Mitchell, E. E., Avoca.
Mitchell, F. L., Everton.
Mitchell, H. F., South Bend.
Mitchell, J. J., Salem.
Mitchell, Josephine M., Lafayette
Mitchell, W. J., North Vernon.
Mitchell, W. K., Ligonier.
Mitchell, W. P., Gaston.
Mix, C. M., Muncie.
Mobley, Lewis F., Summitville.
Moffitt, Wm., West Lafayette.
Molloy, W. J., Muncie.
Montgomery, H. T., South Bend.
Montgomery, J. R., Owensville.
Montgomery, Martin, Owensville.
Montgomery, S. B., Cynthiana.
Moore, Emma W., Kokomo.
Moore, E. P., South Bend.
Moore, H. A., Indianapolis.
Moore, Maurice, G., Vincennes.
Moore, P. G., Wabash.
Moore, W., New Albany.
Moorehead, T. W., Terre Haute.
Morgan, Elmer E., Ft. Wayne.
Morgan, F. B., Huntington.
Moroney, J. H., Winchester.
Morr, J. W., Albion.
Morris, C. C., Rockville.
Morris, G. B., Poneto.
Morris, J. E., Liberty.
Morris, J. L., Kings.
Morris, John E., Indianapolis.
Morris, John L., Columbus.
Morris, O. M., Stanford.
Morris, Thos., Mt. Zion.
Morris, W. F., Ft. Branch.
Morrison, F. A., Indianapolis.
Morrison, John S., Lafayette.
Morrow, Joseph E., Indianapolis.

Morrow, Sarah J., Richmond.
Moschell, J. D., Indianapolis.
Moulder, J. McLean, Kokomo.
Mountain, Joseph R., Connersville.
Moyer, F. E., Pennville.
Muelchi, William, Tell City.
Mueller, F. M., Lawrenceburg.
Mullikin, H. M., Terre Haute.
Mullin, H. Y., Rockfield.
Mullinix, P., Greencastle.
Mumaw, H. A., Elkhart.
Murphy, N. W., Stewartsville.
Murphy, O. C., Scottsburg.
Murphy, R. M., Elkhart.
Murray, D. P., Dunkirk.
Murray, Helen, South Bend.
Myers, B. D., Bloomington.
Myers, C. L., Covington.

Neal, W. A., Elkhart.
Neeley, A. S., Corydon.
Neeley, J. L., Corydon.
Neff, J. H., Fairbanks.
Neier, O. C., Indianapolis.
Nenneker, E. H., Evansville.
Neffen, Robert T., Weisburg.
Nelson, O. O., Huntington.
Nesbit, William S., Dayton.
Neu, Charles F., Indianapolis.
New, J. N., Barnard.
Newcomber, M. V. B., Tipton.
Newforth, C., Sunman.
Newhouse, O. A., Hillside.
Newlin, S. C., Anderson.
Newman, H. M., South Milford.
Newman, M. N., Ossian.
Newton, J. T., St. Bernice,
Niblack, E. S., Terre Haute.
Nichols, John, Atherton.
Nichols, Wm. E., Andrews.
Nichols, W. E., Terre Haute.
Nicodemus, John, Logansport.
Nierman, H. G., Ft. Wayne.
Nieschang, C. C. F., Ft. Wayne.
Nixon, J. E., Ridgeville.
Nixon, John, Farmland.
Noble, Sarah, East Chicago.
Noble, T. B., Indianapolis.
Noland, P. D., Kouts.
Norman, J. I., Parkeville.
Norris, Allen A., Elkhart.
Norris, S. C., Anderson.
Northrup, A. H., Markle.
Norton, F. D., Columbus, R. F. D. 1.
Norton, William J., Hope.
Norval, H. V., Bloomfield.
Null, L. S., New Haven.
Nusbaum, C. E., Bremen.
Nusbaum, J. D., Auburn.
Nusbaum, W. H., Auburn.
Nussell, Frederick, Brazil.
Nye, J. H., Cromwell.

Oberlin, T. W., Hammond.
O'Brien, W. M., Danville.
O'Leary, G. M., Huntington.
Oliphant, J. T., Farmersburg.
Oliver, John H., Indianapolis.
Olmsted, R. T., Versailles.
Olmsted, Florence, North Vernon.
Olney, T. A., South Bend.
O'Neill, Thomas, Anderson.
Orr, W. H., Brazil.
Osborn, John A., Pittsboro.
Osgood, Howard G., Gosport.
Osterman, A. G., Seymour.
Ostroff, H., Indianapolis.
Otto, A. E., Alexandria.
Outland, Edgar M., Indianapolis.
Overman, C. J., Marion.
Overpeck, C. W., Catlin.
Owen, Mary, South Bend.
Owen, W. I., South Bend.
Owens, O. W., Muncie.

Paddock, C. A., Portland.
Page, Lafayette, Indianapolis.
Page, W. B., Middleburg.
Palm, Wm. M., Harmony.
Palmer, Adelbert L., Logansport.
Pannenborg, J. C., Hammond.
Pantzer, Hugo O., Indianapolis.
Parker, E. E., Culver.
Parr, J. N., Jolietville.
Parrish, J. W., Shelbyville.
Parrish, M. F., Monroe.

Parsons, C. H., Rushville.
Pate, J. R., Milan.
Patten, V. C., Morristown.
Patterson, J. W., Fairmount.
Patton, Charles, Terre Haute.
Patton, W. H., Orleans.
Paul, J. O., New Castle.
Paxton, J. T., Glenwood.
Payne, F. M., Princeton.
Payne, J. H., Julietta.
Peacock, S. R., Ladoga.
Peare, R. C., Bellmore.
Pearlman, Samuel, Lafayette.
Peck, W. M., South Bend.
Pell, George M., Carbon.
Perce, B H., Anderson.
Perkins, O. L., Oolitic.
Perry, Charles, Lewis Creek.
Perry, G. L., Portland.
Perry, I. E., Bippus.
Peter, E. L., Flora.
Peters, D. C., Greentown.
Peters, J. B., Macy.
Peters, W. H., Lafayette.
Petersdorf, Gustave A., Indianapolis.
Petet, Marshall, Veedersburg.
Pettijean, J. W., St. Wendell.
Pettigrew, D. A., Flat Rock.
Pettijohn, Fred L., Indianapolis.
Peyton, David C., Jeffersonville.
Pfaff, John A., Indianapolis.
Pfaff, O. E., Indianapolis.
Pfafflin, Charles A., Indianapolis.
Phares, H. E., Shelbyville.
Phares, J. W., Howell.
Phillips, W. R., Orange.
Phipps, D. L., Whiteland.
Phipps, J. M., Indianapolis.
Pickett, J. N., Midland.
Pierce, Harold J., Cloverland.
Pierce, R. J., Richmond.
Pierson, Allen, Spencer.
Pigman, Garrett, Liberty.
Pirtle, G. W., Carlisle.
Ploughe, M. L., Elwood.
Ploughe, M. T., Kempton.
Plummer, I. N., Shoals.
Pohlman, A. G., Bloomington.
Poinier, W. E., Andrews.
Poland, U. G., Muncie.
Pollard, W. S., Evansville.
Porter, George S., Williamsport.
Porter, Jessie B., Elkhart.
Porter, Miles F., Ft. Wayne.
Post, B. O., Sulphur Springs.
Potter, Ch. B., Elkhart.
Potter, J. E., Milford.
Potter, Theodore, Indianapolis.
Pounder, Malcolm, Elkhart.
Powell, E. H., Valparaiso.
Powell, E. U., Greentown.
Powell, J. Z., Logansport.
Powell, N. B., Marion.
Prather, S. A., Vincennes.
Preston, A. L., Fairfield.
Preston, H. P., Plymouth.
Preston, J. L., Greencastle.
Price, C. R., Geneva.
Price, E. O., Ladoga.
Price, M. D., Napanee.
Price, W. A., Napanee.
Pritchett, W. S., Evansville.
Proudfit, Louis, Osceola.
Puckett, J. L., Kokomo.
Pugh, F. H., Williamsport.
Pulliam, John M., Ft. Wayne.
Purkiser, W. J., Salem.
Putnam, W. E., Whiting.

Quick, W. R., Delphi.
Quickel, D. S., Anderson.
Quillen, S. N., Linton.

Radcliffe, F. E., Bourbon.
Ragan, C. E., Clinton.
Ragan, John S., Plainfield.
Ramsbrok, C. R., Huntingburg.
Ramsey, D. C., Mt. Vernon.
Ramsey, J. P., Vincennes.
Randall, E., Ambia.
Randolph, D. F., Waldron.
Randolph, Frank, Elkhart.
Ranke, J. H., Ft. Wayne.
Rankin, T. B., Odon.
Rannells, J. Newton, Rochester.
Rarick, J. E., Wolcottville.

Rariden, Charles E., Bedford.
Ravdin, M., Evansville.
Rawles, L. T., Huntertown.
Rawley, James A., Brazil.
Rawlings, C. L., New Harmony.
Rawlings, Sam'l O., New Harmony.
Ray, C. C., Arcadia.
Ray, C. C., Sanford.
Ray, Frank E., Shelbyville.
Rea, C. G., Muncie.
Rea, C. S., Falmouth.
Rea, O. A., Culver.
Read, H. G., Tipton.
Reader, W. H., New Amsterdam.
Reagan, J. S., Lebanon.
Reagan, R. M., Monon.
Reaviss, W. J., Evansville.
Redding, J. L., Bluffton, R. R. 3.
Reed, A. A., Salem.
Reed, J. H., Logansport.
Reed, J. V., Indianapolis.
Reeve, Jos. L., Edwardsport.
Regennas, E. G., Hope.
Renner, M. E., Urbana.
Rennoe, C. A., South Bend.
Reser, William M., Lafayette.
Revis, George F., Lafayette.
Repan, Robert, Smith's Valley.
Reyer, E. C., Indianapolis.
Reynard, E. G., Union City.
Reynard, G., Union City.
Reynolds, D. Monroe, Clayton.
Reynolds, Francis M., Montpelier.
Reynolds, G. E., Columbus.
Reynolds, James M., Memphis.
Rhamey, B. W., Ft. Wayne.
Rhodes, E. E., Rochester.
Rice, S. M., Terre Haute.
Rice, T. R., Petersburg.
Richards, J., Fulton.
Richards, Renos H., Patricksburg.
Richards, Samuel D., Patricksburg.
Richards, William R., New Albany.
Richardson, W. H., Vernon.
Richey, Samuel R., Donaldson.
Ridenour, D. C., Peru.
Ridpath, H. W., Indianaoplis.
Ried, S. M., Muncie.
Rietz, P. C., Evansville.
Rine, E. W., Winchester.
Ristine, W. H., Crawfordsville.
Ritter, C. L., Indianapolis.
Ritter, H. O., Orangeville.
Ritter, J. K., Seymour.
Ritter, Mary, Angola.
Ritter, R. H., Indianapolis.
Ritter, T. B., Orleans.
Roark, B. H., Jamestown.
Roark, C. A., Milton.
Robbins, F. L., Carlisle.
Robertson, D. W., Deputy.
Robertson, J. F., Indianapolis.
Robinson, C. C., Indiana Harbor.
Robinson, F. C., Martinsville.
Robinson, F. H., Delphi.
Robinson, G. M., Loogootee.
Robinson, H. C., Martinsville.
Robinson, I. T., Wheatland.
Robinson, W. B., Indianapolis.
Robison, J. E., Frankfort, R. R. No. 1
Rogers, A. G., Parker City.
Rogers, H. C., Rockville.
Rogers, J. B., Michigan City.
Rogers, Joseph G., Logansport.
Rogers, O. F., Bloomington.
Rogers, R. C., Bloomington.
Roope, A. P., Columbus.
Root, Wm. W., Parker.
Rose, B. A., Linton.
Rose, B. S., Evansville.
Rosenthal, M. I., Ft. Wayne.
Ross, Alex. A., East Chicago.
Ross, David, Indianapolis.
Ross, George A., Ft. Wayne.
Ross, J. C., Bloomington.
Ross, J. H., Kokomo.
Ross, R. H., Kokomo.
Ross, R. O., Indianapolis.
Ross, W. H., Veedersburg.
Rothrock, M. W., Tell City.
Rothschild, C. H., Ft. Wayne.
Row, George S., Indianapolis.
Rowland, George, Covington.
Royer, E. R., North Salem.
Rubsam, Joseph, Logansport.
Rubush, T. R., London.

Ruby, F. McKay, Union City.
Ruby, Sam B., Union City.
Ruddell, I. N., Jeffersonville.
Ruddick, L., Seymour.
Rufert, A. M., Attica.
Ruhl, W. D., Ft. Wayne.
Runcie, G. W., Poseyville.
Runyan, C. P., Elwood.
Rush, M. A., Anderson.
Rutherford, R. L., New Albany.
Ryker, Charles, Manville.

Salb, J. P., Jasper.
Samuels, William L,. Winnemucca, Nevada.
Sanders, I. M., Greensburg.
Sanders, Joseph, Anderson.
Sandy, W. J., Martinsville.
Sarver, J. A., Scottsburg.
Sauer, Frederick W., Indiana Harbor.
Saunders, D. R., North Vernon.
Sawyer, F. M., South Bend.
Schaeffer, C. R., Indianapolis.
Schaeffer, George C., Bloomington.
Schell, Walker, Terre Haute.
Scherer, S. P., Indianapolis.
Schick, M. F., Ft. Wayne.
Schilling, Carl, Ft. Wayne.
Schilling, John, Ft. Wayne.
Schillinger, R., Richmond.
Schleiker, A. G., East Chicago.
Schneck, Luella N., Indianapolis.
Schneider, A. J., Indianapolis.
Schneider, A. L., Ft. Wayne.
Schoen, P. H., New Middletown.
Scholl, C. E., Camden.
Schreiber, A. H., Lafayette.
Schriefer, E. E., Ferdinand.
Schriefer, J. H., Mosby.
Schrock, H. W., Lagrange.
Schrock, O. L., Lagrange.
Schrock, Stewart, Lagrange.
Schuck, John H., Chandler.
Schultz, Guy A., Lebanon.
Schultz, W. H., Lebanon.
Schuman, O. V., Columbia City.
Schwarts, C. W., Huntingburg.
Schwartz, W. D., Portland.
Scott, J. C., Talma.
Scott, John T., Indianapolis.
Scott, J. W. C., Columbia City.
Scott, Noble W., Huntington.
Scott, R. F., Kokomo.
Scott, W. I., Kokomo.
Scudder, Charles P., Washington.
Scull, Eleanor, Hammond.
Seaman, J. B., Osceola.
Seaton, Albert, Nat. Mil. Home.
Sellers, Ch. A., Montpelier,
Sellers, John, Montpelier.
Sensenich, A. S., Wakarusa.
Sensenich, Roscoe, Wakarusa.
Sensenich, R. Q., South Bend.
Sessions, S. K., Evansville.
Severin, Louis, Bluffton.
Sexton, John C., Rushville.
Seymour, C. A., Wawaka.
Shackelford, T. J., Warsaw.
Shacklett, H. B., New Albany.
Shaddy, Elmer D., Saratoga.
Shaddy, John H., Vevay.
Shafer, W. S., Rochester.
Shafer, J. W., Lafayette.
Shaffer, A. W., Huntington.
Shaley, F. W., Terre Haute.
Shanklin, E. M., Hammond.
Shanklin, Leslie B., Sullivan.
Shanklin, V., Vicksburg.
Shannon, J. B., Greensboro.
Sharp, Harry C., Jeffersonville.
Sharp, Walter N., Indianapolis.
Sharrer, H. E., Hammond.
Sharrer, Wilbur F., Delphi.
Shaw, H. M., Gaston.
Shaw, S. T., Kimmell.
Shaw, C. W., Rising Sun.
Sheek, D. W., Greenwood.
Sheets, William H., Jeffersonville.
Shepherd, G. W., Redkey.
Shepherd, Vincent, Dupont.
Sherlock, J. H., Madison.
Sherwood, B. M., Linton.
Sherwood, E. T., Linton.
Sherwood, W. C., Mitchell.
Shields, J. M., Seymour.
Shields, J. S., Elizaville.

Shipp, Floyd N., Indianapolis.
Shirar, L., Flora.
Shirley, H. W., Shoals.
Shirts, E., Lyons.
Shively, M. T., Marion.
Shoaf, F. A., Veedersburg.
Shobe, W. A., Ligonier.
Shoemaker, S. A., Poneto.
Shonkwiler, Joseph, Rockville.
Shook, N. J., Kendallville.
Short, I. W., Elkhart.
Short, R. B., Bedford.
Short, R. B., Union Mills.
Short, William H., Lagrange.
Shott, D. R., Nebraska.
Showalter, J. E., Waterloo.
Shrum, Riley, Bedford.
Shull, Charles Q., Montpelier.
Shultz, J. B., Logansport.
Shultz, J. J., Delphi.
Shumaker, W. F., Butler.
Sibley, L. H., Asientos, Mexico.
Sickler, J. R., Frankfort.
Sigler, George A., Indianapolis.
Sigler, Glenn V., Burlington.
Sigmon, E. L., New Albany.
Sigmond, H. W., Crawfordsville.
Simmons, L. A., Kokomo.
Simmons, W. D., Clear Creek.
Sims, I. G., Portland.
Sims, J. N., Shoals, R. R. 2.
Sims, S. B., Frankfort.
Sipe, R. W., Orange.
Sisson, Ernest R., Maxwell.
Sledd, S. D., Ft. Wayne.
Sloan, John N., Spencer.
Sloan, W. W., French Lick.
Slocum, Stewart, Fortville.
Slonaker, C. L., Leitersford.
Sluss, J. W., Indianapolis.
Smadel, Jos. W., Vincennes.
Small, E. T., Decker.
Smelzer, S. G., Shirley.
Smick, C. M., Terre Haute.
Smith, C. H., Lebanon.
Smith, C. W., Muncie.
Smith, DeLaskie, Lebanon.
Smith, G. C., Poseyville.
Smith, George F., Lawrenceburg.
Smith, George H., Knightstown.
Smith, Guy A., Ft. Wayne.
Smith, I. F., Arlington.
Smith, Jacob F., Brazil.
Smith, J. A., Brownsville.
Smith, J. W., Vevay.
Smith, Mrs. L. F. J., Wabash.
Smith, L. W., Liberty Center.
Smith, L. W., Wabash.
Smith, Martha J., Indianapolis.
Smith, M. S., Laporte.
Smith, R. H., Kokomo.
Smith, S. E., Richmond.
Smith, S. W., Leesville.
Smith, Thomas G., Brownsburg.
Smith, Thurston, Bloomington.
Smith, W. C., Rushville.
Smith, W. E., Decatur.
Smith, W. H., Oakland City.
Smith, W. H., Bedford.
Smith, W. H., Rushville.
Smoot, D. Brooks, Washington.
Snapp, J. A., Goshen.
Snider, J. W., Fairland.
Snyder, E. R., Troy.
Somes, Joseph L., Vincennes.
Sommer, E. F., Indianapolis.
Souder, C. L., Columbia City.
Sourwine, John D., Brazil.
Sowder, Charles R., Indianapolis.
Spaulding, L., A. Bluffton.
Spear, Robert, East Chicago.
Spencer, M. J., Indianapolis.
Spencer, William A., Wolcott.
Spickermon, H. R., Muncie.
Spigler, O. R., Terre Haute.
Spillman, F. J., Connersville.
Spink, Mary A., Indianapolis.
Spink, T. F., Washington.
Spink, Urbana, Indianapolis.
Spinning, A. L., Covington.
Spitler, Charles E., Saratoga.
Spohn, G. W., Elkhart.
Spooner, Jared, Peru.
Spoor, John, Brooklyn.
Spradley, N. M., Tennyson.
Springston, C. E., Selvin.

Sprowl, John S., Warren.
Spurgeon, O. E., Muncie.
Spurgeon, W. A., Muncie.
Squires, J. W., Ft. Wayne.
Staley, L. B., Bicknell.
Staley, Thomas L., Bicknell.
Stalker, Bodine, Borden.
Stallings, F. L., New Harmony
Stanford, H. H., Lapel.
Stanton, J. J., Logansport.
Stark, H. W., Holland.
Stark, J. W., Evansville.
Starr, W. L., New Albany.
Stauffer, Edwin R., Hammond.
Stauffer, W. A., Elkhart.
Staufft, Hannah O., Elkhart.
Steinkamp, E. F., Haysville.
Stemen, G. B., Ft. Wayne.
Stemm, W. H., North Vernon.
Stephenson, T. J., Lapel.
Sterne, Albert E., Indianapolis.
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Stevens, R. C., Plymouth.
Stevenson, D. W., Richmond.
Stevenson, Geo. A., Rising Sun.
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Stewart, Jonas, Anderson.
Stewart, J. W., Logansport.
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Stockwell, John, Charlestown.
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Sutherland, P. N., Angola.
Sutton, H. H., Aurora.
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Swarts, Willard W., Auburn.
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Tourner, J. P., Bloomington.
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Williams, W. H., Lebanon,
Williamson, A. A., Marshall.
Williamson, Harry, Marion.
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Willien, Leon J., Terre Haute.
Willien M. F., Terre Haute.
Willis, E. A., Indianapolis.
Willis, J. H., Evansville.
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Wilson, H. W., Michigan City.
Wilson, James, Wabash.
Wilson, J. P., Scottsburg.
Wilson, L. A., Michigan City.
Wilson, M. C., Lafayette.
Wilson, R. J., Salem.
Wilson, S. C., Anderson.
Wilson, R. S., Berne.
Wilson, W., Yankeetown.
Wilson, W. L., Scipio.
Wiltfong, C. O., Chesterton.
Wilton, I., Evansville.
Wiltshire, J. W., Bloomington.
Wimmer, G. G., Mt. Etna.
Winans, H. M., Muncie.
Winstandley, W. C., New Albany.
Wiseman, B. W. S., Culver.
Wishard, E. E., Noblesville.
Wishard, W. N., Indianapolis.
Wisner, W. E., Columbus.
Wolfe, H. S., New Albany.
Wolfe, F. E., Lanesville.
Wolfe, J. P., Newmarket.
Wolfe, Z. C., Corydon.
Wolferman, A. G., Indianapolis.
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Wood, H. D., Angola.
Wood, J. M., Greensburg.
Wood, N. S., Anderson.
Wood, T. F., Angola.
Wood, W. F., Mishawaka.
Wood, W. W., Angola.
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Woollen, G. V., Indianapolis.

Woollen, H. M., Indianapolis.
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Worrell, J. P., Terre Haute.
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Wright, Charles L., Huntington.
Wright, Ervin, Huntington.
Wright, Jacob E., Cambridge City.
Wright, J. W., Kokomo.
Wright, Thomas, Boonville.
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Wyatt, A. R., Lagrange.
Wyburn, D. C., Sheldon.
Wyeth, Chas., Terre Haute.
Wynn, Frank B., Indianapolis.

Yager, E. J., Otterbein.
Yarling, J. E., Peru.
Yencer, M. W., Boston.
Yenne, C. H., Washington.
Yocum, Boaz, Coal City.
Yoder, A. C., Goshen.
Young, Franklin, Richmond.
Young, G. M., Evansville.
Young, J. B., Indianapolis.
Young, M. H., Harmony.
Young, S. J., Terre Haute.
Young, S. J., Valparaiso.
Youngblood, E. L., Boonville.
Youngkin, J. W., Wolcottville.
Yung, Rudolph, Terre Haute.

Zaring, C. T., Greencastle.
Zaring, Everett, Reelsville.
Ziliak, A. L., Francisco.
Ziliak, J. E., Haubstadt.
Zimmermann, J., Lynnville.
Zinn, Ch. A., Michigantown.
Zinn, G. E., Elkhart.
Zinninger, Henry A., Lucerne.

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Avery, Jno. P., Indianapolis.
Bare, John W., Salem.
Bell, William H., Logansport.
Bowler, T. J., Muncie.
Brook, Jared E., Plymouth.
Bryan, A. H., Evansville.
Burrage, S., W. Lafayette.
Chatard, Rt. Rev. Bishop, Indianapolis.
Chittenden, G. F., Anderson.
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Comingor, J. A., Indianapolis.
Compton, J. W., Evansville.
Coulter, Stanley, Lafayette.
Darling, N. S., Laporte.
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Furniss, H. W., Bahia, Brazil.
Gould, Vernon, Rochester.
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Jameson, P. H., Indianapolis.
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Moore, S. H., Indianapolis.
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Wiseman, Sumner, Culver.
Wishard, W. H., Indianapolis.
Thorne, J. C., Kokomo.
Wright, Wm. M., Indianapolis.